

MOORE DRAIN FLOOD  
MITIGATION PROJECT

TUSCOLA COUNTY DRAIN  
COMMISSIONER,  
TUSCOLA COUNTY, MICHIGAN

FEMA DR-1346-MI  
HMGP PROJECT NO. A1346.18



**FEMA**

*Prepared for*  
FEMA Region V  
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Sixth Floor  
Chicago, IL 60605

December 12, 2003

**URS**

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**Federal Emergency Management Agency  
PUBLIC NOTICE  
Notice of Availability of the Final Environmental Assessment (EA) and  
Finding of No Significant Impact (FONSI)  
Moore Drain Flood Mitigation, Tuscola County Drain Commissioner Tuscola  
County, Michigan.**

**FEMA-DR-1346-MI, HMGP Application A1346.18**

Interested persons are hereby notified that the Federal Emergency Management Agency (FEMA) is proposing to assist in the funding of flood mitigation measures for Moore Drain and the Cass River in Tuscola County. In accordance with the National Environmental Policy Act (NEPA) of 1969, National Historic Preservation Act (NHPA), Executive Order 11988, Executive Order 11990, and the implementing regulations of FEMA, an environmental assessment (EA) was prepared to assess the potential impacts of the Proposed Action on the human and natural environment. The EA was released for public comment on November 6, 2003. No comments from the public were received during the 30-day comment period, therefore, the EA has been finalized and a Finding of No Significant Impact (FONSI) has been made. This also provides public notice for work within the regulated floodplain and wetlands, in accordance with Executive Orders 11988 and 11990 and 44 CFR Part 9.12. No practicable alternatives were identified to meet the community's needs that do not involve work in the 100-year floodplain or wetlands.

The reasons for the decision not to prepare an Environmental Impact Statement (EIS) are as follows:

1. No significant adverse environmental impacts have been identified to existing land use, water resources (surface water, groundwater, waters of the United States, wetlands, and floodplains), air quality, noise, biological resources (vegetation, fish and wildlife, State-and Federally-listed threatened or endangered species and critical habitats), safety, hazardous materials and waste, or cultural resources; no disproportionately high or adverse effects on minority or low-income populations would occur, and;
2. The project is necessary to meet the needs of the citizens of the existing local community.

No further environmental review of this project is proposed to be conducted prior to the release of FEMA funds. Copies of the final EA and FONSI can be obtained by contacting: Jeanne Millin, FEMA Regional Environmental Officer, 536 South Clark, 6<sup>th</sup> Floor, Chicago, IL 60605-1521, or at [Jeanne.Millin@dhs.gov](mailto:Jeanne.Millin@dhs.gov). The final EA and FONSI are also available on the World Wide Web on the FEMA website at <http://www.fema.gov/ehp/docs.shtm>.

**FINDING OF NO SIGNIFICANT IMPACT**  
**Moore Drain Flood Mitigation Project**  
**Tuscola County Drain Commission,**  
**Tuscola County, Michigan**  
**FEMA-DR-1346-MI, NEMIS ID #A1346.18**

The Tuscola County Drain Commission in Tuscola County, Michigan, has applied for funding from the Federal Emergency Management Agency (FEMA) for assistance with the construction of an earthen berm and culvert upgrades along the Cass River and Moore Drain in the City of Vassar to protect homes and a portion of the commercial, historic downtown area from the effects of frequent flooding. The City of Vassar is located in southwest Tuscola County, approximately 30 miles south of Saginaw Bay. The Proposed Action would provide flood protection in the City by constructing a new earthen berm along the Cass River, and improving an existing earthen berm near the Moore Drain confluence. Other improvements include upgrading culvert and channel capacity along Moore Drain. FEMA is proposing to provide assistance for this project through the Hazard Mitigation Grant Program (HMGP) under Presidential Disaster Declaration FEMA-DR-1346-MI.

In accordance with 44 Code of Federal Regulations (CFR) for FEMA, Subpart B - Agency Implementing Procedures, Part 10.9, an Environmental Assessment (EA) was prepared pursuant to Section 102 of the National Environmental Policy Act of 1969, as implemented by the regulations promulgated by the President's Council on Environmental Quality (40 CFR Parts 1500-1508). The purpose of the EA was to analyze the potential environmental impacts for the stream bank stabilization for Franklin Branch and to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

Based upon the conditions and information contained in the EA for the City of Vassar, Moore Drain Flood Mitigation Project (May 2003) and in accordance with FEMA's regulations in 44 CFR Part 10 (Environmental Considerations) and Executive Orders 11988 (Floodplain Management), 11990 (Protection of Wetlands), and 12898 (Environmental Justice), the following is concluded:

A Finding of No Significant Impact. The proposed project, as described in the EA, will not result in any significant adverse impacts to existing land use, water resources (surface water, groundwater, wetlands, waters of the United States, and floodplains), air quality, noise, biological resources (vegetation, fish and wildlife, state and federally listed threatened or endangered species and critical habitats), safety issues, hazardous materials and waste, and cultural resources, or result in disproportionately high or adverse effects on minority or low-income populations. Therefore, an Environmental Impact Statement will not be prepared.

This Finding of No Significant Impact is based upon the conditions contained in the Environmental Assessment and the requirement that final project designs will be completed and a permit obtained from the Michigan Department of Environmental Quality in accordance with Parts 31, 301, and 303 of the Michigan Natural Resources and Environmental Protection Act. Failure to comply with these conditions may jeopardize federal funds.

APPROVAL

  
Ms. Jeanne Millin  
Regional Environmental Officer  
FEMA, Region V

Date: December 9, 2003

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## List of Acronyms

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APE	Area of Potential Effect
BMPs	Best Management Practices
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
dB	Decibels
DNL	Day-Night Average Sound Level
EA	Environmental Assessment
EDR	Environmental Data Resources
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
HMGP	Hazard Mitigation Grant Program
LUST	Leaking Underground Storage Tank
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
NAAQS	National Ambient Air Quality Standards
NCA	Noise Control Act
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NO <sub>2</sub>	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NREPA	Natural Resources and Environmental Protection Act
NRHP	National Register of Historic Places
O <sub>3</sub>	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
P.L.	Public Law

## List of Acronyms

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PM-10	Particulate Matter with a diameter less than or equal to 10 microns
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
SH	State Highway
SHPO	State Historical Preservation Officer
SO <sub>2</sub>	Sulfur Dioxide
SQG	small quantity generator
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
V:H	Vertical:Horizontal
VOCs	Volatile Organic Compounds

## 1.1 PROJECT AUTHORITY

Severe storms and flooding occurred on September 10 and 11, 2000 in the State of Michigan, leading the Federal Emergency Management Agency (FEMA) to issue a federal disaster declaration, DR-1346-MI, on October 17, 2000. Under this declaration, Oakland and Wayne Counties became eligible for Individual Assistance, and all counties within the state became eligible for funding through the Hazard Mitigation Grant Program (HMGP).

The Tuscola County Drain Commissioner (Applicant) in Vassar City, Michigan, has applied for HMGP Section 404 funding under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Grant funds are provided by FEMA under this program for disaster-related mitigation projects. In accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500 through 1508), and FEMA regulations for NEPA compliance (44 CFR Part 10), FEMA must fully understand and consider the environmental consequences of actions proposed for federal funding. The purpose of this Environmental Assessment (EA) is to meet FEMA's responsibilities under NEPA and determine whether to prepare a Finding of No Significant Impact (FONSI) or an Environmental Impact Statement (EIS) for the proposed project.

## 1.2 PROJECT LOCATION

The City of Vassar (City) is located in Tuscola County, approximately 20 miles southeast of Saginaw and 35 miles northeast of Flint (Figure 1). The confluence of the Cass River and Moore Drain is at the southern extent of the most developed part of the city. The project site is in the heart of the City and encompasses the downtown historic district, Gazebo Park, a portion of Penn Central Railroad and Vassar Rail Trail (a bike trail), and several residences along Cass Street (Figure 2). Also included in the project area is the State Highway (SH) M-15 bridge, the only vehicle bridge crossing over the Cass River for 5 miles in either direction from the City.

## 1.3 PURPOSE AND NEED

There is currently an earthen berm along the Cass River that extends from the M-15 bridge southward approximately 1,200 feet to the confluence of Moore Drain. The height of the berm is insufficient to effectively protect the City from flooding. The City of Vassar experiences flooding from both Moore Drain and the Cass River and receives substantial flooding from both sources approximately once every 2 years. The City has been flooded more than 40 times since 1904 (HMGP Application, 2001). Moore Drain provides relief for an upstream agricultural area of about 12 square miles, as well as the urban stormwater drainage from the City. Flooding of the drain generally results from flash flooding in the upstream watershed as well as Cass River floodwaters backing up into the drain. The Cass River floods less often than the drain (usually during snowmelt), but its impacts to the community are more severe because the waters rise and recede very slowly. Additionally, an extensive study of Moore Drain revealed that when Moore Drain flows are high and Cass River levels are low, flows may travel via a low spot along the existing railroad tracks to the Cass River, and vice versa when Moore Drain flows are low (HMGP Application, 2001).

The downtown business district lies on the downstream end of Moore Drain, between the drain and the river. As a result of repeated flooding, the district has several vacant storefronts, which has impacted employment and tax revenues in the City. Also, homeowners in the vicinity of the downtown district have been affected, and incur about \$148,000 of damage during a 10-year storm event (one that has a 10 percent chance of occurring annually). The bridge approach for the M-15 Highway is frequently flooded and closed, interfering with access to schools and senior citizen facilities on the north side of the Cass River and emergency service providers on the south side of the river (HMGP Application, 2001).

In response to the high risk to human health and safety associated with the occurrence of flooding in the City, the implementation of specific measures to decrease the frequency and extent of flooding has been proposed. The purpose and need of the proposed project would be to provide flood protection for the City for storm events up to, and including, a 10-year storm event.

The CEQ has developed regulations for implementing the NEPA. These federal regulations, set forth in Title 40, CFR Parts 1500-1508, require an evaluation of alternatives, and a discussion of the potential environmental impacts of a proposed Federal action, as part of the EA process. The FEMA regulations, which establish FEMA's process for implementing NEPA, are set forth in 44 CFR, Subpart 10. This EA was prepared in accordance with FEMA's regulations as required under NEPA. As part of this NEPA review the requirements of other environmental laws and executive orders are addressed.

## **2.1 ALTERNATIVE 1 – NO ACTION ALTERNATIVE**

No action would be taken to prevent flooding in the City and risks to human health and safety associated with future flooding events would not be mitigated. Future flooding would continue to negatively impact roads, residences, and businesses.

## **2.2 ALTERNATIVE 2 – BERM ENHANCEMENTS, INSTALLATION OF A DIVERSION CONDUIT, AND MOORE DRAIN UPGRADES (PROPOSED ACTION)**

The Proposed Action consists of three components: modification of an existing earthen berm, construction of a diversion conduit, and improvements to Moore Drain (Figure 3). The first component, modification and extension of the existing earthen berm between the Cass River and downtown areas of the City would be intended to reduce flooding from the Cass River. The berm would provide an 85 percent reduction in the frequency of flooding but it would not protect the City from flood elevations greater than the 10-year event. Representative photographs of the project areas are provided in Appendix A.

The new trapezoidal berm (i.e. the extension) would be constructed on grade at 631.0 feet above National Geodetic Vertical Datum (NGVD) along approximately 3,700 feet of the Cass River, with a 5-foot top width and side slopes of 1 to 6 vertical:horizontal (V:H). The distance from the berm to the river would vary along its length to incorporate existing topography and include structures at risk to flooding, without encroaching on those structures. At its upstream extent, approximately 1,200 feet northeast of the Penn Central Railroad bridge over Cass Street, the berm would be less than 2 feet in height, and would be situated approximately 600 feet from the river. The berm would pass behind approximately nine residences and across The Gazebo park (a small recreational park), and extend to the railroad tracks at Cass Street, where it would tie in to the existing grade supporting the tracks. On the south side of the grade, the berm would continue approximately 300 feet south through a small wooded area to a point 150 feet from the river. From there, the berm would extend approximately 1,500 feet southwest to the M-15 bridge over the Cass River, where it would tie into an existing berm at the bridge. At the M-15 bridge, the berm would be approximately 4 feet in height and 10 feet from west bank of the Cass River.

South of the M-15 bridge, the existing berm would be elevated 1 to 2 feet along its entire length to a height of 631.0 feet NGVD. The berm increase would extend downstream approximately 1,200 feet to the confluence of the Cass River and Moore Drain. At the confluence, another extension would be constructed to the north across a seasonally inundated backwater area of Moore Drain, connecting the improved existing berm to higher topography. This berm would be approximately 300 feet long and range in height from less than 1 foot to 5 feet. An 18-inch culvert would be installed at the confluence of the drain and river to alleviate ponding that could result from the berm extension. The culvert would be located just southeast of the berm (between the berm and the river) and would direct excess water towards the river.

The second component of the project addresses flooding that occurs from Moore Drain and would involve construction of a diversion conduit that would connect the drain to the Cass River near the Penn Central Railroad tracks upstream of the City. A 900-foot long single or double concrete box culvert would run parallel to the railroad tracks, allowing for excess waters in Moore Drain to be diverted around the historic part of the City to the Cass River. The conduit

would start west of the railroad at Moore Drain, cross under Cass Street, and then continue along the east side of the railroad tracks. Installation of the conduit would require excavation of approximately 9,000 square feet of both open and forested land in existing Moore Drain right-of-ways (ROWs) and easements. A flap gate would be installed at the downstream end of the conduit to prevent Cass River floodwaters from entering Moore Drain.

The third component of the project would involve improvements to Moore Drain to increase its capacity within the City. The improvements would include replacement of undersized culverts at five street crossings in the downtown area. The five crossings are located at Spring Street, Huron Street, Oak Street, and in two parking lots in the downtown area. The culvert at Spring Street would be a 13-foot by 9-foot concrete box culvert. Huron Street and Parking Lot #1 would include 12-foot by 9-foot concrete box culverts, and Oak Street and Parking Lot #2 would include 10-foot by 7-foot concrete box culverts.

During construction, which is estimated to last four months, best management practices (BMPs) would be implemented to reduce erosion and sedimentation. The berm construction and alteration would not affect local traffic, but the culvert improvements, with the exception of the Huron Street culvert, would require temporary detours.

The City would be responsible for maintaining a grass cover on the berm and inspecting its structural integrity on a regular basis. The Tuscola County Drain Commissioner would be responsible for annual inspection of the flap gates and diversion conduit and for inspecting Moore Drain and its culverts every two years.

### **2.3 ALTERNATIVE 3 – BERM ENHANCEMENTS AND CONSTRUCTION OF TWO DETENTION PONDS**

Alternative 3 would involve the same berm enhancements described for the Proposed Action, but instead of a diversion conduit and culvert replacements, two subdivided detention ponds would be installed along the Moore Drain, upstream from the City (Figure 3). Under this alternative, the berm would also provide an 85 percent reduction in the frequency of flooding, but it would not protect the City from flood elevations greater than the 10-year event.

The first pond would be approximately 130 acres in size and would be located upstream from the Penn Central Railroad crossing at Moore Drain. The pond would extend northeast for approximately 7,300 feet, and would be bordered on the west by the natural contour relief of the hill, and on the east by the Penn Central Railroad spur. At its upstream end, the pond would be bordered by the intersection of Kirk Road and Waterman Road.

The second pond would be located northeast and upstream of the first pond, northeast of the intersection of Kirk Road and Waterman Road. This pond would be approximately 50 acres in size.

Each pond would have a 3:1 V:H side slope and would be surrounded by a 25-foot-wide buffer strip. The ponds would each consist of two basins divided by Moore Drain and would be offline (i.e. not part of the drain's channel). The ponds would be separated from Moore Drain by buffer strips containing 2-foot high berms with a 3:1 V:H side slope and a 10-foot top width. The berms would extend along both banks of the drain for the length of both detention ponds. Flows would

enter the ponds through high-water overflow weirs, and the ponds would be connected to Moore Drain by dewatering pipes that would use gravity to drain flows from the ponds.

## **2.4 ALTERNATIVES CONSIDERED AND DISMISSED**

Flood proofing, property acquisition and removal, and elevation were all considered and dismissed. The City has been utilizing these techniques since 1986 and they are effective mitigation tools, but they are not feasible as large scale projects in the City. One major reason is they would alter the historic integrity of the downtown district; one site downtown is listed in the National Register of Historic Places (NRHP) and ten structures downtown are listed as Michigan Historic Sites. Additionally, these measures would not satisfy the purpose and need of the project because they would not alleviate flooding of roads, specifically the approach to the M-15 bridge. Therefore, these alternatives were dismissed and are not analyzed further in this EA.

**Table 1: Impact Summary Matrix**

A. Description of Alternative	No Action Alternative (Alternative 1)	Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Alternative 2 – Proposed Action)	Berm Enhancements and Construction of Two Detention Ponds (Alternative 3)
	FEMA funds would not be used for improvements to the existing drainage system in Tuscola County.	Berm modifications would be made along the Cass River to offer protection for the 10-year storm event, a diversion conduit would be constructed to reduce flooding in the City, and 5 culverts would be replaced along Moore Drain.	The same berm modifications would be made as described for the Proposed Action and two detention ponds (50 acres and 130 acres) would be constructed along Moore Drain.
B. Potential Impacts	No Action Alternative	Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Alternative 2 – Proposed Action)	Berm Enhancements and Construction of Two Detention Ponds (Alternative 3)
Geology, Seismicity, and Soils	<ul style="list-style-type: none"> <li>• No impacts to soils and prime farmland.</li> <li>• The geologic structure of the area would not be impacted.</li> </ul>	<ul style="list-style-type: none"> <li>• Temporary disturbance to soils in the project area; surface erosion may increase during project construction.</li> <li>• The geologic structure of the area would not be impacted.</li> </ul>	<ul style="list-style-type: none"> <li>• Significant temporary disturbance to soils in the project area; surface erosion may increase during project construction.</li> <li>• The geologic structure of the area would not be impacted.</li> </ul>
Water Resources and Water Quality	<ul style="list-style-type: none"> <li>• The effects from flooding in the project area would not be reduced.</li> <li>• Moore Drain would continue to flood and floodwaters would continue to flow between Moore Drain and the Cass River.</li> </ul>	<ul style="list-style-type: none"> <li>• The City would be protected from Moore Drain and Cass River flooding for a 10-year storm event.</li> <li>• Floodwaters would not flow between Moore Drain and Cass River during 10-year or less storm events.</li> <li>• Erosion may occur during construction.</li> <li>• No anticipated effects to groundwater resources.</li> </ul>	<ul style="list-style-type: none"> <li>• The City would be protected from Moore Drain and Cass River flooding for up to the 10-year storm event.</li> <li>• Erosion may occur during construction.</li> <li>• No anticipated effects to groundwater resources.</li> </ul>

# SECTION TWO

## Alternative Analysis

B. Potential Impacts	No Action Alternative	Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Alternative 2 – Proposed Action)	Berm Enhancements and Construction of Two Detention Ponds (Alternative 3)
Floodplain Management	<ul style="list-style-type: none"> <li>No impacts to the floodplain would be anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to the 100-year floodplain would be anticipated. Storm events greater than the 10-year recurrence interval would still impact the City.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to the 100-year floodplain would be anticipated. Storm events greater than the 10-year recurrence interval would still impact the City.</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>No impacts to air quality would be anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Fugitive dust emissions due to heavy construction equipment may have a temporary impact on local air quality.</li> <li>Mechanical vehicles have the potential to temporarily increase criteria air pollutants of concern.</li> </ul>	<ul style="list-style-type: none"> <li>Fugitive dust emissions due to heavy construction equipment may have a temporary impact on local air quality.</li> <li>Mechanical vehicles have the potential to temporarily increase criteria air pollutants of concern.</li> </ul>
Terrestrial and Aquatic Environment	<ul style="list-style-type: none"> <li>No impacts to the terrestrial or aquatic environment would be anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Wildlife would be minimally impacted.</li> <li>Less than one-tenth of an acre of forested habitat would be removed. It would cause a moderate localized impact but a minimal impact in the context of the Vassar riparian zone.</li> <li>Effects to the aquatic habitat would be limited to erosion potential and the isolation of Moore Drain from the Cass River.</li> </ul>	<ul style="list-style-type: none"> <li>There would be a potential for the loss of up to 54 acres of forested land.</li> <li>There would be a considerable impact to riparian wildlife.</li> <li>Major localized vegetative loss to agricultural land, that would have a minimal net impact to associated wildlife and vegetative composition.</li> <li>No adverse impacts are anticipated to the aquatic habitat.</li> </ul>

<b>B. Potential Impacts</b>	<b>No Action Alternative</b>	<b>Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Alternative 2 – Proposed Action)</b>	<b>Berm Enhancements and Construction of Two Detention Ponds (Alternative 3)</b>
Wetlands	<ul style="list-style-type: none"> <li>No impacts to wetlands would be anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Berm construction would disturb two small potential wetland areas.</li> <li>Preliminary estimates indicate that less than 0.5 acre of wetlands would need to be constructed to mitigate wetland loss.</li> <li>Culvert replacements and the diversion conduit would not be anticipated to impact wetlands.</li> </ul>	<ul style="list-style-type: none"> <li>Berm construction would disturb two small potential wetland areas.</li> <li>The larger pond would disturb approximately 22 acres of forested, scrub-shrub, and emergent wetlands and the smaller pond would disturb approximately 19 acres of scrub-shrub wetlands.</li> <li>Preliminary estimates indicate that up to 62 acres of wetlands would need to be constructed to mitigate wetland loss.</li> </ul>
Threatened and Endangered Species	<ul style="list-style-type: none"> <li>No impacts to proposed or listed threatened and endangered species would be anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to proposed or listed threatened and endangered species would be anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to proposed or listed threatened and endangered species would be anticipated.</li> </ul>
Hazardous Materials and Wastes	<ul style="list-style-type: none"> <li>Based on results from an EDR database search, no impacts to hazardous materials or wastes are anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Based on results from an EDR database search, no impacts to hazardous materials or wastes are anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Based on results from an EDR database search, no impacts to hazardous materials or wastes are anticipated.</li> </ul>
Zoning and Land Use	<ul style="list-style-type: none"> <li>No direct impacts to land use and zoning would be anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Easements for up to 9 parcels would need to be acquired.</li> <li>Diversion conduit would not alter land use.</li> <li>Zoning and land use would be preserved by a reduction in flooding.</li> </ul>	<ul style="list-style-type: none"> <li>Easements for up to 9 parcels would need to be acquired.</li> <li>Up to 180 acres of residential land (used for agriculture) would be redesignated for City use and would have a moderate to adverse localized impact.</li> </ul>

<b>B. Potential Impacts</b>	<b>No Action Alternative</b>	<b>Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Alternative 2 – Proposed Action)</b>	<b>Berm Enhancements and Construction of Two Detention Ponds (Alternative 3)</b>
Visual Resources	<ul style="list-style-type: none"> <li>No immediate impacts would occur to existing visual resources.</li> <li>Water would continue to flood the City during excessive snowmelt or precipitation, creating unsightly conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary visual impacts to project area may occur during construction as a result of equipment and stockpiles.</li> <li>Diversion conduit would be buried underground and would not be visible.</li> <li>The remaining improvements would alter the landscape slightly but would not degrade the visual resources of the area.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary visual impacts to project area may occur during construction as a result of equipment and stockpiles.</li> <li>Detention ponds would alter the scenic integrity of the landscape but would not significantly impact visual resources.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>No construction would occur and no additional noise would be generated.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary increase in the ambient noise levels due to equipment use during construction.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary increase in the ambient noise levels due to equipment use during construction, but impact would be minimal due to the sparsity of the population in the project area</li> </ul>
Public Services and Utilities	<ul style="list-style-type: none"> <li>There would be no impact to utilities but public services would continue to be impacted by road closures during severe storm events.</li> </ul>	<ul style="list-style-type: none"> <li>Public services and utilities would not be impacted.</li> </ul>	<ul style="list-style-type: none"> <li>Public services would not be impacted.</li> <li>Utilities would be avoided as much as possible during construction and there would be a minimal impact.</li> </ul>
Traffic and Circulation	<ul style="list-style-type: none"> <li>Flooding would continue to close the M-15 bridge and affect traffic and circulation.</li> </ul>	<ul style="list-style-type: none"> <li>The berm would temporarily alter pedestrian traffic on the Rail Trail.</li> <li>Three detours would be designated during construction but would be of short duration.</li> <li>The two parking lot culvert replacements would slightly decrease parking capacity in the lots but would not alter traffic or circulation.</li> </ul>	<ul style="list-style-type: none"> <li>The berm would temporarily alter pedestrian traffic on the Rail Trail.</li> <li>Detention ponds would not impact traffic or circulation.</li> </ul>

<b>B. Potential Impacts</b>	<b>No Action Alternative</b>	<b>Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Alternative 2 – Proposed Action)</b>	<b>Berm Enhancements and Construction of Two Detention Ponds (Alternative 3)</b>
Environmental Justice	<ul style="list-style-type: none"> <li>Executive Order 12898 is not applicable to this alternative</li> </ul>	<ul style="list-style-type: none"> <li>Minority or low-income populations are not concentrated in project area, and therefore would not be impacted by project activities.</li> </ul>	<ul style="list-style-type: none"> <li>Minority or low-income populations are not concentrated in project area, and therefore would not be impacted by project activities.</li> </ul>
Safety and Security	<ul style="list-style-type: none"> <li>There would be no potential risks to the personal safety of those who would otherwise be performing project-related activities.</li> <li>Potential safety risks to residents and businesses in the event of a flood would remain unchanged.</li> </ul>	<ul style="list-style-type: none"> <li>All project activities would be performed using qualified personnel and conducted in accordance with the standards specified in OSHA regulations.</li> <li>Overall, the project activities would decrease risks to human health and safety associated with some flood events.</li> </ul>	<ul style="list-style-type: none"> <li>All project activities would be performed using qualified personnel and conducted in accordance with the standards specified in OSHA regulations.</li> <li>Overall, the project activities would decrease risks to human health and safety associated with some flood events.</li> </ul>
Cultural Resources	<ul style="list-style-type: none"> <li>There would be no construction, and therefore, no historic or archaeological resources would be disturbed.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to historic or archaeological resources are anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>No impacts to historic or archaeological resources are anticipated.</li> </ul>

## 3.1 PHYSICAL ENVIRONMENT

### 3.1.1 Geology, Seismicity and Soils

The project area is located in the “thumb” of Michigan’s Lower Peninsula, which lies within the Michigan Basin, a large regional structure composed of a variety of sedimentary rocks that were deposited in the Pennsylvanian Period of the Paleozoic Era. Tuscola County is a flat lake plain that slopes gradually to Lake Huron, and there is a slight depression in the landscape at the Cass River. Elevations in the project area range from approximately 625 to 640 feet above NGVD (USACE, 1982). The land within the rural basin lying northwest of Moore Drain is much higher in elevation, with respect to the drain. The land southeast of Moore Drain is more flat, and contains numerous swampy areas that make up part of the Vassar State Game Area. Tuscola County is underlain by bedrock of the Saginaw Formation and Grand River Formation: The Grand River Formation is a sandstone that fills erosional valleys in the underlying Saginaw Formation, and the Saginaw Formation consists of fine-grained sandstone and siltstone interbedded with shale, limestone, coal, and gypsum (MDEQ, 2002 and USGS, 2002a). The bedrock ranges in thickness from a millimeter to slightly more than 700 feet, but it is approximately 100 feet thick in Vassar (USGS, 2002a). Bedrock is covered by glacial deposits, except on lower reaches of some of the streams. Quaternary sediments overlaying the bedrock include lacustrine clay and silt with some lacustrine sand and gravel and fine textured glacial till (MDEQ, 2002).

The low-lying area along the Cass River consists of outwash plains and ground moraines. The dominant soil association northeast of Vassar is the Pipestone-Granby-Chelsea, which encompasses approximately 16 percent of the county (USDA, 1986). This association is described as nearly level to gently rolling, somewhat poorly drained, poorly drained, and somewhat excessively drained, sandy soils on outwash plains, moraines, lake plains, and beaches (USDA, 1986). The following soil types occur in the Proposed Action and Alternative 3 project areas (Figure 4):

- 10B – Pipestone fine sand, 0 to 4 percent slopes: most areas of this soil are used as woodland. Some are used as cropland.
- 29B – Metea loamy fine sand, 1 to 6 percent slopes: most areas of this soil are used as cropland. A few are used as pasture or woodland. Considered prime farmland.
- 32B – Thetford loamy fine sand, 0 to 4 percent slopes: most areas of this soil are used as cropland or woodland. Some are used as pasture.
- 33 – Granby loamy fine sand: most areas of this soil are used as woodland or grassland. Some drained areas are used as cropland.
- 39B – Ottokee loamy fine sand, 0 to 6 percent slopes: most areas of this soil are used as woodland. Some are used as cropland or pasture.
- 53 – Sloan loam: most areas of this soil are used as cropland or pasture. Some are wooded. Considered prime farmland where drained and either protected from flooding or not frequently flooded during the growing season.

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- 71A – Rapson loamy fine sand, 0 to 3 percent slopes: most areas of this soil are used as cropland. Some are pastured or wooded. Considered prime farmland where drained.

The Farmland Protection Policy Act (FPPA) was enacted in 1981 (P.L. 98-98) to minimize the unnecessary conversion of farmland to non-agricultural uses as a result of federal actions. Programs administered by federal agencies must be compatible with state and local farmland protection policies and programs. The Natural Resources Conservation Service (NRCS) is responsible for protecting significant agricultural lands from irreversible conversions that result in the loss of an essential food or environmental resource.

According to the United States Geological Survey (USGS) National Earthquake Information Center, no significant (Modified Mercalli Intensity VII or more) earthquakes have occurred in Michigan in the last 50 years. The last significant earthquake was a magnitude 4.4 in 1947 (USGS, 2002b). The National Seismic Hazard Mapping Project shows that Tuscola County has a low probability of seismic activity.

### **Alternative 1 – No Action Alternative**

Impacts to geology, seismicity, and soils would not occur under this alternative, as no construction would occur.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Soils would be disturbed during construction and alteration of the berm, but the majority of the soils along the berm pathway have been previously disturbed. The culvert replacements and diversion channel would occur in previously disturbed areas, but temporary disturbance to soils would occur during diversion conduit installation and culvert replacements, increasing potential soil loss due to erosion. Erosion would be minimized through the use of stormwater BMPs such as placing silt fences and hay bales, and seeding and mulching exposed soils shortly after disturbance. Specifically, Moore Drain would be reshaped and revegetated 33 feet upstream and downstream of all new culverts. Soils that would be stockpiled on-site should be covered to help prevent fugitive dust and soil erosion.

The movement of heavy machinery could result in soil compaction in some areas. To mitigate the effects of heavy equipment use and compaction, it is recommended that project activities occur during dry periods (precipitation limited to less than 1 inch in the week prior to equipment use) and that compacted areas be disked or raked and then revegetated after project completion.

Because all excavations would be relatively shallow, no impacts are anticipated to local geology. The Proposed Action is not anticipated to result in impacts to geological conditions and is expected to have a minimal impact on soil conditions. Because the project area is predominantly urban and none of it is currently farmed, the Proposed Action is exempt from the FPPA.

### **Alternative 3 – Flood Control Utilizing a Berm and Detention Ponds**

Impacts to geology under Alternative 3 would be similar to the Proposed Action: no adverse effects are anticipated because excavation to bedrock would not occur. However, a significant amount of soils would be disturbed.

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Constructing 180-acres of detention pond would require the excavation of approximately 815,000 cubic yards of soil along Moore Drain. These soils would be tested and certified clean-fill, and used to construct the walls of the detention pond. Excess fill would be made available to the city for public works projects, the local golf-course, the general public, or disposed of at a site permitted to receive clean fill. Should any of the excavated material test positive for contaminants, that material would be disposed of at a facility permitted to receive such material. Based on the agricultural and forested land use of the site, no hazardous materials at concentrations above the local background arithmetic mean are anticipated to be present.

Due to the large area of land that would be disturbed, a National Pollution Discharge Elimination System (NPDES) permit would be required from the Michigan Department of Environmental Quality (MDEQ) prior to construction. During construction activities, exposed soils have increased potential to erode due to wind and water action. Since project activities would include stockpiling soil on site, the project applicant should cover these soils to help prevent fugitive dust and soil erosion. Erosion would also be minimized by using stormwater BMPs such as placing silt fences and hay bales, and seeding and mulching exposed soils shortly after disturbance. In addition to the berm, the detention ponds would be revegetated after completion to prevent future erosion.

The movement of heavy machinery could result in soil compaction in some areas. To mitigate the effects of heavy equipment use and compaction, it is recommended that project activities occur during dry periods (precipitation limited to less than 1 inch in the week prior to equipment use) and that compacted areas be disked or raked and then revegetated after project completion.

On September 11, 2002, the NRCS was contacted to determine the potential impacts to prime farmlands as a result of Alternative 3. URS staff completed an AD-1006 form, which assists NRCS in determining these impacts (Appendix B). After reviewing the AD-1006 form, Mr. James Graham of the NRCS, Caro Field Office, confirmed via telephone on October 2, 2002, that this alternative would not have significant adverse impacts to prime farmland, no additional sites need to be evaluated, and no future correspondence with his agency on Alternative 3 would be required (Appendix B). Therefore, Alternative 3 is exempt from the FPPA.

### **3.1.2 Water Resources and Water Quality**

According to the U.S. Environmental Protection Agency (EPA), the City of Vassar is within the Cass Watershed, which comprises approximately 710 square miles. The Cass River is a major tributary in the eastern portion of the Saginaw River Basin, which covers approximately 8,700 square miles (Wade-Trim, 2000).

The Cass watershed is characterized by the EPA as having “more serious” water quality problems with a low vulnerability to future decline due to stressors that currently exist within the watershed. Less than 20 percent of the assessed river, lakes, and streams meet all designated uses. Predominant stressors within the watershed, primarily derived from agricultural land use, include a high potential for pesticide and nitrogen runoff, and a moderate potential for delivery of sediments from agricultural activities. Groundwater quality within the watershed is evaluated as good; less than 5 percent of the groundwater samples in the watershed contained half of the maximum contaminant level defined for all the chemical contaminants regulated under the Safe Drinking Water Act (EPA, 2002a).

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Moore Drain is approximately 4 miles long, most of which is a natural, open channel. The downstream 4,000 feet of the drain within the city limits of Vassar have been modified by channelization. The drain generally has a sand and gravel bottom, and it has a drainage area of approximately 12 square miles, 98 percent of which is agricultural and 2 percent of which is developed land (Wade-Trim, 2000). Six bridges and two culverts cross the drain within the City. Moore Drain has no gages and no historical peak flow data has been collected. However, it has been noted that peak flows in the Cass River typically occur about 38 hours after peak flow in Moore Drain (Wade-Trim, 2000).

Although there is high potential for agricultural runoff, both the Cass River and Moore Drain watersheds have good water quality in Tuscola County (USACE, 1982) and are not listed by the MDEQ as being in non-attainment or threatened (MDEQ, 2002).

The City draws drinking water from four municipal groundwater wells. The MDEQ has classified the wells as “not vulnerable” to contamination. The City routinely monitors for contaminants and has had no violations in the past 5 years (Vassar, 2002).

Michigan has received authorization from the federal government to administer Section 404 of the Clean Water Act in most areas of the state. Water resources in the state are regulated in accordance with Part 301, Inland Lakes and Streams, of the Natural Resources and Environmental Protection Act (NREPA), as amended.

### **Alternative 1 – No Action Alternative**

Under the No Action Alternative, frequent flooding would continue to occur within the City. The agricultural area draining into Moore Drain would continue to overwhelm the drain, and high flows would continue to move between Moore Drain and the Cass River.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

The Proposed Action is not anticipated to adversely affect water resources. This alternative would increase flow capacity in Moore Drain and help to alleviate flooding from the upstream watershed, as well as protect the City from the 10-year storm event and prevent floodwaters from flowing between Moore Drain and the Cass River. Water from the river that normally backs up into Moore Drain would be blocked by the flap gates. Erosion and sedimentation that may occur during construction would be minimized by using stormwater BMPs such as the placement of silt fencing and hay bales, and mulching recently seeded areas. These impacts would be temporary and occur during construction.

In compliance with Section 404 of the Clean Water Act (CWA), the MDEQ was consulted in a letter dated May 14, 2001. In a response letter dated May 31, 2001, MDEQ stated that the project would be reviewed and may require a permit under Part 301, Inland Lakes and Streams, of the NREPA (Appendix B).

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Under Alternative 3, erosion potential during construction would be high due to the extent of excavation. However, erosion would be minimized by using stormwater BMPs such as the

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placement of silt fencing and hay bales, and mulching recently seeded areas. This alternative would help to alleviate flooding from the upstream watershed and would protect the City from the 10-year storm event. Water in the detention ponds could possibly slightly recharge the groundwater supply.

In compliance with Section 404 of the CWA, the MDEQ was consulted in a letter dated September 12, 2002. In a response letter dated October 10, 2002, MDEQ stated that this alternative would be reviewed and may require a permit under Part 301, Inland Lakes and Streams, of the NREPA (Appendix B).

### **3.1.3 Floodplain Management (Executive Order 11988)**

Executive Order (EO) 11988 directs federal agencies to take actions to minimize occupancy of and modifications to floodplains. Specifically, EO 11988 prohibits FEMA from funding construction in the 100-year floodplain unless there are no practicable alternatives. FEMA's regulations for complying with EO 11988 are promulgated in 44 CFR Part 9. FEMA applies the Eight-Step Planning Process, as required by regulation, to meet the requirements of EO 11988. This step-by-step analysis is included in Appendix B of this document.

Floodplains refer to the 100-year floodplains as set by FEMA and are shown on Flood Insurance Rate Maps (FIRMs) for all communities participating in the National Flood Insurance Program (NFIP). The 100-year floodplain designates the area inundated during a storm having a one-percent chance of occurring in any given year. FEMA also identifies the 500-year floodplain. The 500-year floodplain designates the area inundated during a storm having a 0.2 percent chance of occurring in any given year.

The City of Vassar participates in the NFIP, and the project area is located on FIRM Community Panel Number 260208 0001C, effective June 19, 1989 (Figure 5). According to the FIRM, the project site is located within the 100-year floodplain and floodway of the Cass River. In a letter dated May 31, 2001, the MDEQ stated that with a slight berm design alteration the project could be permitted under the State's Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the NREPA. The Proposed Action and Alternative 3 would occur within the Cass River 100-year floodplain. No practical alternatives were identified to reduce flooding in the City of Vassar that do not involve construction within the 100-year floodplain of the Cass River. The avoidance of wetlands and the reduction of floodplain impacts were considered for the berm locations and would be incorporated in final designs.

#### **Alternative 1 – No Action Alternative**

Since no construction would occur under this alternative, there would be no impacts to any regulated floodplain.

#### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

An MDEQ letter dated April 13, 2001 stated that the Proposed Action would not adversely impact the stage and discharge characteristics of the Cass River and that it would meet the intent of the Floodplain Regulatory Authority, as long as the berm is not above the 10-year flood

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elevation or closer to the river than the preliminary design (Appendix B). The letter stated that in order to meet the intent of the Floodplain Regulatory Authority under Part 31 of the NREPA, the berm location would need to be modified. Revised berm locations were provided by MDEQ in the letter.

In addition to the analysis performed by MDEQ, Wade-Trim conducted a preliminary hydrologic and hydraulic analysis for the berm and concluded that the project would not significantly impact the 100-year flood stage of the Cass River (Wade-Trim, 2000). URS reviewed and concurred with Wade-Trim's hydrologic and hydraulic analysis of the berm and also conducted an analysis of other project components, including the diversion conduit. The preliminary design and the alternate berm locations provided by MDEQ were reviewed. The analysis concluded that the discharge from the conduit would be less than 2 percent of the effective 100-year flood discharge, and therefore, would minimally impact water surface elevations upstream and downstream of the discharge point (the railroad). However, the Tuscola County Drain Commissioner would need to submit a no-rise certification to FEMA before commencing construction to substantiate that the project would not increase flood levels for the 100-year event. The berm would provide an 85 percent reduction in the frequency of flooding but it would not protect the City from floods greater than the 10-year elevation. The improvements to Moore Drain would not impact the floodplain, and flood events greater than the 10-year recurrence interval would still affect the City. If any changes are made to the project designs that modify the berm locations provided by MDEQ, the Applicant must resubmit the design to FEMA for review and concurrence.

Impacts to the floodplain would include vegetation removal and potential soil compaction as a result of equipment use. Use of heavy equipment on wet or damp soils can compact soils to the extent that infiltration rates within the floodplain could decrease, increasing runoff and erosion. To mitigate the effects of heavy equipment use and compaction, it is recommended that project activities occur during dry periods (precipitation limited to less than 1 inch in the week prior to equipment use). Soil compaction in the floodplain could temporarily affect its filtering ability (by decreasing infiltration rates), but the area of impact would be limited and any impacts would not be long-term. Since the floodplain habitat that would be disturbed as part of the project has been previously disturbed and is on the fringe of an urban area, the value of the floodplain habitat would not be altered. Additionally, the project would help to enhance the floodplain's storage capacity and ability to convey floodwaters.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Since the berm is also a component of Alternative 3, its impacts to the floodplain would be the same as those described for the Proposed Action. An MDEQ letter dated October 10, 2002 stated that the applicant must prove that upstream flood stages would not be harmfully increased by the detention ponds to obtain the permit required for this alternative under the State's Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the NREPA. Also, the Tuscola County Drain Commissioner would need to submit a no-rise certification to FEMA to substantiate that the project would not increase flood levels for the 100-year event before commencing construction. The berm would provide an 85 percent reduction in the frequency of flooding but it would not protect the City from floods greater than the 10-year storm event elevation. The detention ponds would not impact the floodplain, and flood events greater than the 10-year recurrence interval would still affect the City. If any changes are made to the project

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designs that modify the berm locations provided by MDEQ, the Applicant must resubmit the design to FEMA for review and concurrence.

Impacts to the floodplain would include vegetation removal and potential soil compaction as a result of equipment use. Use of heavy equipment on wet or damp soils can compact soils to the extent that infiltration rates within the floodplain could decrease, increasing runoff and erosion. To mitigate the effects of heavy equipment use and compaction, it is recommended that project activities occur during dry periods (precipitation limited to less than 1 inch in the week prior to equipment use). Soil compaction in the floodplain could temporarily affect its filtering ability (by decreasing infiltration rates), but the area of impact would be limited and any impacts would not be long-term. Since the floodplain habitat that would be disturbed as part of the project has been previously disturbed and is on the fringe of an urban area, the value of the floodplain habitat would not be altered. Additionally, the project would help to enhance the floodplain's storage capacity and ability to convey floodwaters.

### **3.1.4 Air Quality**

EPA regulates 6 criteria pollutants that could cause adverse health effects. National Ambient Air Quality Standards (NAAQS) have been set for sulfur dioxide (SO<sub>2</sub>), particulate matter with a diameter less than or equal to 10 microns (PM-10), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), and lead (Pb). NAAQS are typically established for a variety of averaging times, ranging from one hour to one year.

The Michigan Air Quality Monitoring Program, a division of the MDEQ, oversees and reports on results of federally mandated National Air Monitoring Stations and State and Local Air Monitoring Sites as well as the Special Purpose Monitoring Stations network in Michigan. Air quality measurements from this network are used to demonstrate the attainment status with regard to NAAQS. Ambient air monitoring is also a requirement for State Implementation Plans.

Michigan is in attainment for 5 of the 6 criteria pollutants mandated by the EPA. The State of Michigan has been in attainment for CO since 1999, Pb and NO<sub>2</sub> since 1978, PM-10 since 1996, and SO<sub>2</sub> since 1982. Several counties are in non-attainment status for O<sub>3</sub>. Tuscola County, however, is in attainment for all six criteria pollutants (EPA, 2002c).

#### **Alternative 1 – No Action Alternative**

The existing situation does not generate pollutants that significantly contribute to the degradation of the quality of air. As a result, no impacts to air quality from criteria or other pollutants are anticipated in the vicinity of the site.

#### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Implementation of the Proposed Action would involve limited use of heavy construction equipment such as backhoes, excavators, and bulldozers for the drainage upgrade and berm installation/renovation. Proposed construction duration is approximately four months.

Heavy construction equipment is a source of fugitive dust emissions that may have a substantial temporary effect on local air quality. Emissions during construction can be associated with

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ground excavation, earth moving, and construction. Dust emissions can vary substantially from day to day depending on the level of activity, the specific operations, and weather. Emissions from fuel-burning internal combustion engines (heavy equipment and earthmoving machinery), could temporarily increase the levels of volatile organic compounds (VOCs) and some of the priority pollutants, including CO, NO<sub>2</sub>, O<sub>3</sub>, and particulate matter.

Potential impacts to air quality would be short-term and temporary in nature. To mitigate for fugitive dust and equipment emissions, vehicle engines would be turned off while not in use, construction roads would be watered when dusty conditions exist, and local residents would be advised to close windows during periods of heavy construction activity to prevent dust from infiltrating their homes.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Impacts under this alternative would be similar to those described for Alternative 2, the Proposed Action. The potential for fugitive dust and vehicular emissions would be greater than that of the Proposed Action, however, because a much larger amount of soil would be disturbed and construction would last longer. To mitigate for fugitive dust and equipment emissions, vehicle engines would be turned off while not in use and construction roads would be watered when dusty conditions exist. No precautions would need to be taken by residents because the area of disturbance is sparsely populated. Potential impacts to air quality would be short-term and temporary in nature.

## **3.2 BIOLOGICAL ENVIRONMENT**

### **3.2.1 Terrestrial and Aquatic Environment**

#### ***Terrestrial Habitat***

The City lies near the northern limits of the extensive Eastern Broadleaf forest that stretches south to the Appalachian Mountains in Pennsylvania and east through New England. In central Michigan, the forests are comprised of mainly deciduous species dominated either by oak/hickory or beech/maple. The majority of land around Vassar is unforested and used for agriculture.

Less than 0.5 mile upstream and downstream of Vassar, forest and agricultural lands dominate the riparian zone of the Cass River. Within the city limits, especially between the M-15 Bridge and the railroad bridge upstream, the river is lined with a small corridor of trees maintained in an ornamental setting. One exception to this is a small stand of trees on the northern bank comprising approximately 1.5 acres. This emerging stand is dominated by red maple (*Acer rubrum*) and silver maple (*Acer saccharinum*), with smaller components of pawpaw (*Asimina triloba*), willow (*Salix* sp.), and ash (*Fraxinus* sp.).

Within a 0.25-mile radius of the site, a residential and commercial environment dominates the terrestrial habitat. Trees, ornamental shrubs, and cultivar grasses planted along streets and in yards provide the majority of the habitat. The best quality habitat noted in this area is the riparian zone along the Cass River. Although planted with cultivar grasses and shrubs through much of the city, larger tracts of undisturbed forest are found less than 0.25-mile from the city.

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The proposed detention pond site is predominantly agricultural land that is currently being farmed for corn and soybean. A forested buffer between the western bank of Moore Drain and the agricultural fields occupies about 30 percent of the alternate project site (pers. comm., White). This zone is dominated by eastern cottonwood (*Populus deltoides*), box elder (*Acer negundo*), willow (*Salix* sp.), American elm (*Ulmus americana*), and red ash (*Fraxinus pennsylvanica*).

Common wildlife in the vicinity of the project area are white-tailed deer (*Odocoileus virginianus*) and species often found near aquatic environments such as Great Blue Heron (*Ardea herodias*), muskrat (*Ondatra zibethicus*), and beaver (*Castor canadensis*).

### ***Aquatic Habitat***

The Cass River in the vicinity of Vassar has been noted as, “an outstanding smallmouth bass stream... [t]he best fishing is in the reach between Cass City and Vassar” (Bedford, 2002). According to Michigan Department of Natural Resources (MDNR), in addition to smallmouth bass (*Micropterus dolomieu*), other common fish species such as stonecat (*Noturus flavus*), sunfish (*Lepomis* sp.), white sucker (*Catostomus commersonii*), and darter (*Etheostoma* sp.) are also found in the Cass River near Vassar. Northern pike (*Esox lucius*) may also occur as a transient. Common minnows such as the spotfin shiner (*Cyprinella spiloptera*), common shiner (*Luxilus cornutus*), Redfin shiner (*Lythrurus umbratilis*), hornyhead chub (*Nocomis biguttatus*) have also been documented in the vicinity of Vassar (Center for Geographic Information, 2002).

A macroinvertebrate community study by the EPA indicated that the watershed is dominated by a low taxa diversity of midges, low numbers of Ephemeroptera-Plecoptera-Trichoptera taxa, with a low index of community integrity scores. However, the Cass River in the vicinity of Vassar was rated good for water quality based on biological and chemical parameters (EPA, 2002b).

The Moore Drain is a small, highly disturbed stream that provides drainage for approximately 12 square miles of agricultural land before passing through the historic commercial district of Vassar and flowing into the Cass River. Although the stream may support some aquatic insects, macroinvertebrates, crayfish, minnows, and perhaps small catfish near its mouth, the quantity and quality of habitat is minimal in comparison to the habitat in the Cass River.

### **Alternative 1 - No Action Alternative**

Under the No Action Alternative, no ground disturbing activities would occur. Future flooding would continue to affect downtown Vassar, as it has historically. Because floodplain vegetation is well adapted to flooding, no adverse effects to terrestrial or aquatic habitat is anticipated.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

#### ***Terrestrial Habitat***

Construction activities for the berm and diversion conduit would primarily occur on groomed cultivar grasses and on an already paved and developed hiking/biking trail extending south from the M-15 Bridge to the confluence of the Moore Drain and Cass River. The specific route of the berm would also preserve nearly all of the small forested stand located between the M-15 Bridge and the railroad bridge on the northern bank. Approximately less than 0.10 of an acre of forested

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habitat would be removed. This adverse effect is moderate when compared to the level of development in Vassar, but minimal in the larger context of the Cass River riparian zone. The localized impact would be permanent because the berm area would be kept free of woody plants after construction. Mitigation for the loss of forested habitat would be compliant with all local, state, and federal laws, regulations, and requirements. Specific mitigation measures would be developed during the final design and review phase.

Adverse effects to wildlife would be minimal. During construction activities, some wildlife such as squirrel, chipmunk, and bird species well adapted to human presence would be disturbed. At least temporarily, these species may even abandon habitat adjacent to the construction activities. Once construction activities are concluded, however, displaced wildlife is anticipated to return. Therefore, this impact would be temporary and minimal.

Berm construction would also require the removal of less than 0.10 of an acre of relatively immature, mixed-hardwood forest. This would result in the reduction of the stand area by approximately 8 percent. Although some permanently displaced wildlife would colonize adjacent or nearby habitats, it is anticipated that at least some wildlife would be lost.

The new culvert and culvert replacements would all occur on previously disturbed ground and would not be anticipated to adversely impact the terrestrial habitat.

### ***Aquatic Habitat***

Effects to the aquatic habitat under the Proposed Action would be limited to the potential for erosion into the waters of Moore Drain and the Cass River due to construction activities, and due to isolating Moore Drain from the Cass River as a result of the flap gate.

At times, berm and diversion conduit construction would occur within 10 feet of the banks of the Cass River. To mitigate against degradation of aquatic habitat due to erosion, the applicant would use BMPs such as silt fencing and hay bales, and seed exposed soils with grasses. Minimal adverse effects are anticipated due to berm construction and diversion conduit installation.

Enlarging the capacity of Moore Drain and upgrading culverts along its downstream extent would require excavating portions of the channel and placing new culverts into the waterway. This is a severe disturbance to the aquatic habitat of Moore Drain in the immediate vicinity of the project. Impacts would be limited, however; because adjacent aquatic habitat is available for temporary refuge and colonization of the improved drain is anticipated soon after construction concludes. Long-term impacts due to channel improvements are expected to be minimal.

Installing a flap gate at the confluence of the Moore Drain and Cass River would isolate the aquatic communities of the Cass River and Moore Drain. According to studies by the United States Department of the Interior, Fish and Wildlife Service (USFWS), flap gates can interfere with fish migration but there are several solutions that lessen the impact. One method is to modify the gate mounting hardware so the gate is rotated about 90 degrees and it is hinged on the side, allowing the gate to remain in the open position at times of low flow. A second method is to use a lightweight gate such as plastic or aluminum that allows fish and other aquatic species to pass through (USFWS, 2002).

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To minimize adverse effects that may result from the installation of flap gates and to allow for fish passage during low flow periods, the applicant should modify the structure using one of the methods described above.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Under Alternative 3, impacts to the terrestrial and aquatic habitat resulting from berm enhancements would be similar to those occurring under the Proposed Action. Mitigation for the loss of forested habitat would be compliant with all local, state, and federal laws, regulations, and requirements. Specific mitigation measures would be developed during the final design and review phase.

The major vegetative loss would involve agricultural land. Although this would impact a few homeowners, the net impact would be minimal when compared to the amount of agricultural land available in Tuscola County and the benefits to the community resulting from this alternative. Additionally, as discussed in Section 3.1.1, Geology, Seismicity, and Soils, prime farmland would not be adversely impacted as a result of Alternative 3.

Since approximately 180 acres of land would be excavated for the detention ponds and about 30 percent of the project area is forested, there would be potential for the loss of up to 54 acres of forested land. Because the forested land is concentrated around Moore Drain, it is highly likely that most of the timber would be removed. Species to be removed are associated with riparian areas and likely provide habitat for migrating birds, local waterfowl, and transient wildlife. A decline in riparian forest habitat in this area may have a considerable impact, as the surrounding landscape is primarily agricultural. The impact may be offset somewhat by the fact that 3,058 acres of low lying natural woodlands (the Vassar State Game Area) exist east of the project site; however this woodland is not riparian. For this reason, following project activities, the applicant should replant similar native trees species along the perimeter of the detention ponds, where appropriate, to mitigate for lost habitat.

Disturbances on the agricultural lands would be likely to have a minimal impact to the area's overall vegetative composition and wildlife species. Some wildlife species may be permanently displaced; however, abundant agricultural habitat exists adjacent to the project site.

Although the potential for erosion is high due to the amount of excavation, effects to the aquatic habitat of Moore Drain would be minimal because no work would occur in the waterway and the applicant would use BMPs such as silt fencing and hay bales, and seed exposed soils with grasses to mitigate against erosion and sedimentation.

### **3.2.2 Wetlands (Executive Order 11990)**

The term wetland refers to areas that are inundated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, intrastate lakes, rivers, streams (including intermittent streams), mudflats, sloughs, and similar areas.

Under EO 11990, federal agencies are required to minimize the destruction, loss, or degradation of wetlands and preserve and enhance their natural and beneficial values. If a federal action has

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the potential to impact jurisdictional waters of the United States as defined by Section 404 of the CWA, the U.S. Army Corps of Engineers (USACE) would be contacted for appropriate permitting requirements. Section 404 of the CWA authorizes the USACE to issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill material into waters of the United States at specified disposal sites. FEMA applies the Eight-Step Decision-Making Process, required by 44 CFR Part 9, to meet the requirements of EO 11990.

Michigan has received authorization from the federal government to administer Section 404 of the CWA in most areas of the state. Wetlands in the state are regulated in accordance with Part 303, Wetlands Protection, of the NREPA and MDEQ is the administering agency for these regulations. Consultation with MDEQ was initiated in letters dated May 14, 2001 and September 12, 2002. MDEQ's responses are provided below. Copies of the correspondence are provided in Appendix B.

Prior to conducting a site characterization, MDNR wetland mapping was reviewed for a preliminary identification of wetlands within the vicinity of the site. Based on this review, wetlands designated as open water, forested, scrub-shrub, and emergent are located within or adjacent to the project area (Figure 6). A formal delineation of wetlands and waters of the United States in the potential areas of impact was not conducted as part of this report, but might be required and conducted during the permitting process.

During the site characterization conducted on March 13, 2002, wetlands were observed within and adjacent to the project site. A wetland associated with a 1 acre depression near the mouth of the Moore Drain was inundated with approximately three feet of water. In a subsequent site visit on May 14, 2002, the same area was observed to be dominated by cultivar grasses and regularly mowed. Although hydrophytic vegetation does not dominate this site, MDEQ would likely require a soil sample to confirm the area is not hydric (pers. comm., Bonnette). A second wetland was identified near the forested area between the M-15 Bridge and the railroad bridge, adjacent to the river. This forested wetland is dominated by willow species and would likely be regulated should construction activities impact it (pers. comm., Bonnette).

### **Alternative 1 - No Action Alternative**

Under the No Action Alternative, no wetlands would be affected due to construction activities. No adverse impacts to wetlands are anticipated.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

The Proposed Action has the potential to affect both of the wetlands described above. Although wetlands could be avoided through berm relocation, part of the Proposed Action may result in the disturbance of wetlands. The MDEQ has reviewed the project and in a letter dated May 31, 2001, stated that the project would undergo a permit review process under Part 303, Wetlands Protection, of the NREPA. During permitting, the MDEQ would determine appropriate mitigation for any wetlands impacted. MDEQ mitigation policy for wetlands impacts requires 1.5 acres of wetland construction for every acre of wetland destroyed. Preliminary estimates indicate the City would be required to construct less than 0.5 acre of wetland as a result of the project. The MDEQ also indicated that the Moore Drain alterations must be done in a manner

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that does not adversely impact upstream wetlands. Sufficient analyses would be conducted during final design to demonstrate the protection of upstream wetlands. Documentation of the Eight-Step Decision-Making Process required under EO 11990 is provided in Appendix C.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Although most wetlands (except the two areas described above) could be avoided by relocating the berm around sensitive areas, construction of detention ponds would likely result in the destruction or modification of wetlands. Estimates from the MDNR Wetland Map (Figure 6) are that approximately 22 acres would be impacted as a result of the 130-acre pond and 19 acres would be impacted as a result of the 50-acre pond. Approximately 25 acres of wetlands are classified as scrub-shrub, 11 acres are forested, and 5 acres are emergent wetlands. MDEQ mitigation policy for wetlands take requires 1.5 acres of wetland construction for every acre of wetland destroyed. Preliminary estimates indicate the City would be required to construct approximately 61.5 acres of wetland as a result of the detention ponds and less than one-half acre of wetland as a result of the berm enhancements. An MDEQ letter dated October 10, 2002, states that the project would undergo a permit review process under Part 303, Wetlands Protection, of the NREPA, wherein mitigation measures would be specified. MDEQ also indicated that the detention ponds must be designed to avoid impacts to upstream wetlands. Sufficient analyses would be conducted during final design to demonstrate the protection of upstream wetlands. Documentation of the 8-step process required under EO 11990 is included as Appendix C.

### **3.2.3 Threatened and Endangered Species**

The Endangered Species Act (ESA) of 1973 requires federal agencies to determine the effects of their actions on threatened and endangered species of wildlife and plants, and their habitats, and to take steps to conserve and protect these species.

In a letter dated May 4, 2001, FEMA requested the MDNR and the USFWS to review records for known occurrences of threatened, endangered, or otherwise significant plant and animal species, natural plant communities, and other natural features. In letters dated June 4, 2001 and June 13, 2001, the USFWS and MDNR responded there are no known occurrences of federal- or state-listed threatened, endangered, or otherwise significant species, natural plant communities, or natural features at the site. Because of the amount of time elapsed and the development of Alternative 3, another review was requested in a letter dated September 12, 2002. The USFWS and MDNR responded in letters dated September 24, 2002 and October 1, 2002, which stated that both agencies concurred with their initial review (Appendix B).

Based on these consultations, no further consideration is required for the No Action Alternative, Alternative 2 (Proposed Action), or Alternative 3 regarding impacts to threatened or endangered species.

## **3.3 HAZARDOUS MATERIALS**

Hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), are defined as “a solid waste, or combinations of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating

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reversible illness or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed.” While the definition refers to “solids,” it has been interpreted to include semisolids, liquids, and contained gases as well.

Hazardous materials and wastes are regulated in Michigan via a combination of federally mandated laws and state laws developed by the MDEQ. The hazardous waste statutes are contained as Sections 324.11101 – 324.11153 of the NREPA, as amended.

To determine the presence and approximate location of known hazardous materials in the vicinity of the proposed project, Environmental Data Resources (EDR), an independent information service, conducted a database search. The database search queries multiple federal, state, and local hazardous materials and underground storage tank (UST) databases. The database search of the project and surrounding areas identified five small quantity generator (SQG) sites within 0.125 of a mile and six leaking underground storage tanks (LUSTs). Potential contamination associated with two of the SQG sites and three of the LUSTs would not impact the project because they are located east of the river and would be hydrologically separated from the project site. One of the listed SQG sites is the M-15 bridge, which was included in the database as a result of lead-based paint that was removed in 1989. The two remaining SQG sites are located west of Moore Drain. The sites are identified as Cook Oldsmobile GMC, Inc. and Carquest Auto Parts of Vassar; neither site has any recorded violations.

Three LUSTs west of Moore Drain were identified in the EDR report. Two sites are located at elementary schools. A LUST at Elkton Elementary School was closed on December 11, 1990, and a LUST at Central Elementary School was closed on March 28, 1995. The third LUST, located at Cook Oldsmobile GMC, Inc., was closed on August 5, 1992.

The database search also generates a list of handlers with RCRA corrective action activity. The handler closest to the project site is Grede Foundries, Inc., which processes iron and steel and is located between 0.5 to 1.0 mile of the project site. The foundry had numerous violations for arsenic and chromium between 1984 and 1997, and had groundwater monitoring requirements as recently as 1997. Because of its distance from the project site, impacts associated with the foundry are not anticipated.

A reconnaissance level survey for hazardous materials and wastes in the project vicinity was conducted by URS on March 13, 2002. No obvious indicators for the presence of hazardous materials such as drums, tanks, stressed vegetation, or vent pipes were observed. No subsurface hazardous materials testing was conducted in the project area as a part of this EA. Conclusions are based only on the field reconnaissance, database search, and reported historical use of the properties.

### **Alternative 1 - No Action Alternative**

Under the No Action Alternative, no flood mitigation activities would be undertaken using FEMA funds. If any hazardous wastes or materials occur in the project area, they would not be altered from their present condition.

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### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Based upon the EDR database search, under the Proposed Action Alternative, no impacts to hazardous materials or wastes are anticipated.

Although subsurface hazardous materials are not anticipated to be present in the project area, excavation activities could expose or otherwise affect subsurface hazardous wastes or materials. Any hazardous materials discovered, generated, or used during implementation of the proposed project would be disposed of and handled by the Tuscola County Drain Commissioner in accordance with applicable local, state, and federal regulations.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Based upon the EDR database search, under Alternative 3, no impacts to hazardous materials or wastes are anticipated.

Although subsurface hazardous materials are not anticipated to be present in the project area, excavation activities could expose or otherwise affect subsurface hazardous wastes or materials. Any hazardous materials discovered, generated, or used during implementation of this alternative would be disposed of and handled by the Tuscola County Drain Commissioner in accordance with applicable local, state, and federal regulations.

## **3.4 SOCIOECONOMICS**

### **3.4.1 Zoning and Land Use**

The first permanent settlement was formed in Tuscola County in 1836, but due to the county's remoteness and lack of roads, growth was slow. In 1850, there were only 291 residents and 300 acres of improved land (Page, 1883). The early settlers mainly depended on the lumber industry for their livelihood, but after a massive fire swept through the area in 1881, primary land use shifted to agriculture. Although the county has a population today of approximately 58,000, it is still very rural with 66 percent of its 812 square miles dedicated to agricultural uses (MEDC, 2001). The county ranks number one in the state in sugar beet production, but it also produces potatoes, dairy products, corn, and wheat.

The City of Vassar, which was founded in 1849, is bordered by agricultural land and by over 3,000 acres of low lying natural woodlands to the northeast that make up the Vassar State Game Area. According to USACE land use and zoning maps for Vassar, approximately 40 percent of the project area is zoned as closed streets (inaccessible to vehicular traffic), 40 percent is zoned as single family residential, and 20 percent is zoned as central business. Much of the business district is historic (see Section 3.5 – Cultural Resources). As for land use, about 5 percent of the land is open forest, 15 percent is recreational (Gazebo Park), and 80 percent is either urban or built up.

A Tuscola County Drain Commissioner study found the Moore Drain basin to consist of 12.4 square miles of agricultural land upstream of the Penn Central Railroad and 0.29 square mile of urban land within Vassar. The agricultural portion of the basin includes a nearly equal mix of agricultural land and forested land.

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The proposed detention pond site is approximately 70 percent agricultural and 30 percent forested (pers. comm., White). Most of the land in the proposed detention pond area is privately owned and zoned as single family residential.

### **Alternative 1 – No Action Alternative**

Under the No Action Alternative, there would be no direct impact to current land use and zoning. Flooding of businesses and residences would continue to be a frequent occurrence, however, and could adversely impact land use in the area.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Easements for up to nine parcels (the number would depend on the final berm location) would need to be acquired from homeowners for berm construction. The City of Vassar does not anticipate difficulty in obtaining these easements. The diversion conduit would be constructed in an existing drain ROW and would not alter any land use. The new culvert and replacement culverts would also not impact land use. Over half of the land in the project area is currently dedicated to drainage improvements/flood protection. The Proposed Action would be consistent with current zoning and land uses and would preserve current land uses by reducing the negative impacts associated with frequent flooding.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Easements for up to nine parcels (the number would depend on the final berm location) would need to be acquired from homeowners for berm construction. The City of Vassar does not anticipate difficulty in obtaining these easements.

Land for the detention ponds would need to be acquired from homeowners. The City anticipates some opposition to these acquisitions. If the land is acquired, there would be a moderate to adverse localized impact associated with the conversion of up to 180 acres of residential land to City use.

## **3.4.2 Visual Resources**

Visual resources refer to the landscape character (i.e., what is seen), visual sensitivity (i.e., human preferences and values regarding what is seen), scenic integrity (i.e., degree of intactness and wholeness in landscape character), and landscape visibility (i.e., relative distances of seen areas) of a geographically defined viewshed.

The downtown portion of the City of Vassar is comprised of a small main street with several retail stores and restaurants. The Moore Drain runs through the downtown area and serves as a scenic waterway. Along its banks, recreational paths have been established that enable residents and visitors to walk or bike along a portion of the Drain. Outside of the downtown area, single-family residences line many of the streets. Landscaping within the downtown area, adjacent City streets, and along Moore Drain consists primarily of cultivar trees and shrubs. The landscape surrounding the City is primarily flat with agricultural fields. Pockets of trees exist within the agricultural fields and along the northern portion of Moore Drain.

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### **Alternative 1 – No Action Alternative**

Drainage improvements would not occur under this alternative. Water would continue to flood the City during periods of excessive snowmelt and precipitation, creating unsightly conditions.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Visual resources would not be adversely impacted under this alternative. Since a berm currently exists in the City, an extension would alter the landscape minimally. The other alterations to the berm (i.e., elevating it by 1 to 2 feet) and the installation of a flap gate would not obstruct views of the river or drain. The diversion conduit would be buried underground, and the new culvert and culvert replacements would minimally alter the landscape in the vicinity of Moore Drain. Heavy equipment and soil stockpiles would be seen in the project area during construction, but this would be short-term. These modifications would slightly alter the landscape, but would be a minimal change to visual resources.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Under Alternative 3, impacts of the proposed berm would be similar to those listed in the Proposed Action. Creation of the detention ponds to the north of Vassar would represent a change to the scenic integrity of the surrounding landscape, as flat, oftentimes barren, agricultural lands would be converted to concave, periodically-filled, water features. Additionally, forested woodlands currently along the drain would be removed for water storage purposes. Heavy equipment and soil stockpiles would be seen in the project area during construction, but this would be temporary.

Overall, these modifications would alter the landscape, but would not represent a stark contrast to the current landscape or have a substantial negative impact.

### **3.4.3 Noise**

Sound is most commonly measured in decibels (dB) on the A-weighted scale, which is the scale most similar to the range of sounds that the human ear can hear. The Day-Night Average Sound Level (DNL) is an average measure of sound. The DNL takes into account the volume of each sound incident, the number of times each incident occurs, and the time of day each incident occurs (nighttime sound being weighted more heavily because it is assumed to be more annoying to the community). The DNL descriptor is accepted by federal agencies as a standard for estimating sound impacts and establishing guidelines for compatible land uses.

Noise, defined herein as unwanted or unwelcome sound, is regulated by the federal Noise Control Act of 1972 (NCA). Although the NCA gives the EPA authority to prepare guidelines for acceptable ambient noise levels, it only charges those federal agencies that operate noise-producing facilities or equipment to implement noise standards. The EPA's guidelines (and those of many federal agencies) state that outdoor sound levels in excess of 55 dB DNL are "normally unacceptable" for noise-sensitive land uses such as residences, schools, and hospitals.

Noise associated with the proposed project would be emitted from mechanical equipment used in the construction of the berm and back flow prevention structures, diversion conduit installation,

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and culvert replacement. The City of Vassar has a citywide noise ordinance (Article V, Sec. 38-181) that restricts construction to the hours of 7 a.m. and 7 p.m. Monday through Saturday, unless a permit is obtained from the City Manager (pers. comm., Kern).

### **Alternative 1 – No Action Alternative**

Under the No Action Alternative, no construction would occur and no additional noise would be generated. Noise levels would be expected to remain at current levels.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Noise associated with the Proposed Action would be emitted by mechanical equipment used during construction. Equipment associated with the Proposed Action includes backhoes, excavators, and bulldozers. As the work would be conducted near a park, businesses, and some residences, visitors and residents of the area may be subjected to construction-related noise that could reach 80 dB during daytime periods. This noise would not be constant and would be temporary; construction would be limited to the hours of 7 a.m. and 7 p.m. Monday through Saturday, only during the two to three months of proposed construction.

To mitigate for these potential noise impacts, the Tuscola County Drain Commissioner would be required to inform residents of the construction period and potential noise impacts, as well as suggested mitigation measures, such as closing windows during construction or planning daily errands around construction times.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Noise impacts associated with Alternative 3 would be similar to those listed in the Proposed Action. Although construction associated noise would last longer than under the Proposed Action, this is not anticipated to affect residents, as the project area is sparsely populated. Nonetheless, the Tuscola County Drain Commissioner would be required to inform residents of the construction period and potential noise impacts. This noise would not be constant and would be temporary; construction would be limited to the hours of 7 a.m. and 7 p.m. Monday through Saturday.

#### **3.4.4 Public Services and Utilities**

The City of Vassar has its own police, fire, and emergency services. The police department has 5 officers and the fire department has 21 firefighters (Vassar, 2002). The City provides water and sewage service to roughly 860 residents (pers. comm., Richards). Ameritech provides the basic telephone infrastructure, Detroit Edison supplies electric service, and Consumers Power provides natural gas. Vassar has a public bike path called Vassar Rail Trail, which runs through the project area.

### **Alternative 1 – No Action Alternative**

No immediate impacts to public services and utilities are anticipated under the No Action Alternative. The risk of flooding would remain within the project area, and future flooding would

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continue to cause temporary road closures, affecting the ability of emergency personnel to access certain areas. These effects would be temporary in duration, but recurring with each future flood event.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

None of the components of the Proposed Action would interfere with public services or utilities. The diversion conduit would be constructed in an existing drain ROW. The Rail Trail would be integrated into the berm configuration and care would be taken to maintain the original path. If required, the bike trail would be repaved and incorporated into the berm. No utilities would be disturbed by construction of the new culvert or the replacement culverts. No interference with or relocation of utilities is anticipated (pers. comm., Sherrill).

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Alternative 3 would have a minimal impact to public services or utilities. The Rail Trail would be integrated into the berm configuration and care would be taken to maintain the original path. If required, the bike trail would be repaved and incorporated into the berm. During the final stages of detention pond design, utility locations would be determined and the ponds would be engineered to minimize interference and relocation of utilities (pers. comm., White).

#### **3.4.5 Traffic and Circulation**

Presently, schools and senior citizen facilities are located on the north side of the Cass River and emergency services (such as ambulance, fire, and police) and city maintenance crews are located on the south side of the river. Traffic counts from 1999 indicate that approximately 8,500 non-commercial vehicles and 380 commercial vehicles use the M-15 bridge daily (HMGP, 2001). Flooding frequently causes closure of this bridge, which is the only river crossing for 5 miles in either direction, resulting in at least a 12-mile (or 15 to 20 minute) detour.

### **Alternative 1 – No Action Alternative**

Under the No Action Alternative flooding would continue to cause road closures, including the M-15 bridge, causing detours and potential risks to the residents of the City due to delays in emergency services.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Although the berm would temporarily alter pedestrian traffic on the Rail Trail during construction, berm construction would not alter vehicular traffic or cause any detours. In total, the culvert replacements would take about 1 to 1.5 months to complete and replacements would occur sequentially. The new 18-inch culvert would not occur near a road and would not require alteration of traffic. The two parking lot culvert replacements would slightly reduce available parking space in the lots but would not cause parking or traffic problems. Traffic flow would be maintained for the Huron Street culvert replacement because it is a main thoroughfare through

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downtown. The remaining three culvert replacements would require detours, but the detours would involve minimal distances and traffic impacts. To mitigate for any potential delays or road closures, appropriate signage and detour routes would be posted during construction.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Although the berm would temporarily alter pedestrian traffic on the Rail Trail during construction, berm construction would not alter vehicular traffic or cause any detours. Construction of the detention ponds would not require any detours or delays and would not impact traffic or circulation.

#### **3.4.6 Environmental Justice (Executive Order 12898)**

EO 12898, entitled, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” directs federal agencies to “make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.”

This section examines the impact of the proposed action and alternatives on minority and low-income populations and determines whether the proposed action would have a disproportionately high and adverse effect on the populations.

According to U.S. Census data from 2000, approximately 88.4 percent of the City’s 2,823 residents are white. Additionally, approximately 8.3 percent are African American, and the remaining 3.3 percent are comprised of American Indian/Alaska Native persons, Asian persons, and persons of other races. Economic census data from 1997 cites the median household income as \$36,568, which is slightly less than the state’s average of \$38,883. The percentage of persons below the poverty level was 11 percent; slightly lower than the state’s average of 11.5 percent. During the site visit on March 13, 2002, no minority or low-income housing was observed in the vicinity of the project area. Based on the socioeconomic statistics and the proposed project’s location away from residential buildings, the requirement to evaluate this project relative to EO 12898, Environmental Justice is not triggered.

### **Alternative 1 – No Action Alternative**

Under the No Action Alternative, all residents of the community would continue to be impacted by flooding of the Cass River and Moore Drain.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Under the Proposed Action, no minority or low-income populations would be adversely impacted. The project would benefit the entire community and the local economy by reducing the risks and costs associated with flooding.

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### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Under Alternative 3, no minority or low-income populations would be adversely impacted. The project would benefit the entire community and the local economy by reducing the risks and costs associated with flooding.

#### **3.4.7 Safety and Security**

Safety and security issues that have been considered in this analysis include the health and safety of the area residents, the public at-large, and the protection of personnel involved in construction activities.

EO 13045, Protection of Children, requires federal agencies to make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children. The Gazebo Park and Vassar Rail Trail are located in the project area and are likely to be routinely utilized by children.

### **Alternative 1 – No Action Alternative**

Under the No Action Alternative, the potential for flooding to occur would remain. Without mitigating the flooding risk, the potential for adverse impacts to public safety from future flood events in the proposed project area would be greater than either the Proposed Action or Alternative 3.

As the No Action Alternative does not involve the employment of personnel to perform project activities, there would be no potential risks to the personal safety of those who would otherwise be performing construction activities.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

Under the Proposed Action, excavation activities could present safety risks to persons performing the activities. To minimize risks to safety and human health, all project activities would be performed using qualified personnel trained in the proper use of the appropriate equipment, including all appropriate safety precautions. Additionally, all activities would be conducted in a safe manner in accordance with the standards specified in Occupational Safety and Health Administration (OSHA) regulations.

During construction activities, safety measures to mitigate potential impacts to the general public, including children, entail employing appropriate signage and safety fencing to warn the public of dangerous slopes and activities, and restrict access to those sites. Although use of Gazebo Park and the bike trail would be slightly restricted during construction, these impacts would only be temporary and the reduction of floodwaters to these areas as a result of the project would result in long-term benefits for the public. Overall, the project activities would decrease risks to human health and safety associated with storms equal to or less than a 10-year storm event.

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### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

Impacts of Alternative 3 and associated mitigation measures would be similar to those described for the Proposed Action.

### **3.5 CULTURAL RESOURCES**

In addition to review under NEPA, consideration of impacts to cultural resources is mandated under Section 106 of the National Historic Preservation Act (NHPA), as amended, and implemented by 36 CFR Part 800. Requirements include identification of significant historic properties that may be impacted by the Proposed Action Alternative. Historic properties are defined as archaeological sites, standing structures, or other historic resources listed in or eligible for listing in the NRHP (36 CFR 60.4).

As defined in 36 CFR Part 800.16(d), the Area of Potential Effect (APE) “is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist.”

A database search for historic properties was conducted by EDR. One listing in the NRHP was identified in the project vicinity. The property, the Hotel Columbia, is located at 194 East Huron Avenue in downtown Vassar. Ten properties were identified in the project vicinity that are included on the Michigan Historic Sites database. These properties are located in downtown Vassar and include churches, commercial buildings, residential homes, a school, and an opera house.

In addition to identifying historic properties that may exist in the proposed project’s APE, FEMA must also determine, in consultation with the appropriate State Historic Preservation Officer (SHPO), what effect, if any, the action would have on historic properties. Moreover, if the project would have an adverse effect on these properties, FEMA must consult with the SHPO on ways to avoid, minimize, or mitigate the adverse effect.

Requests for identification of historical or archaeological resources within the project area were submitted to SHPO on May 14, 2001 and September 12, 2002. FEMA has concluded, and the Michigan SHPO concurs, that no archaeological or historic resources are present at the project site. The SHPO review letters dated June 28, 2001 and November 5, 2002 can be found in Appendix B.

Requests for evaluation of the presence or absence of known archaeological and Indian Religious sites within the proposed project areas were submitted to all of the federally recognized tribal groups in Michigan on July 16, 2002. An additional letter with updated information for the Alternative 3 detention ponds was issued by FEMA on October 18, 2002 (Appendix B). Responses were received from the Hannahville Indian Community and the Ziibiwing Cultural Society indicating that no known significant Indian properties for their communities are anticipated to occur within the project area. The Lac Vieux Desert Band of Lake Superior Chippewa Tribal Government responded that the project area is located beyond their boundaries.

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### **Alternative 1 – No Action Alternative**

Under the No Action Alternative, no construction would occur and no undiscovered historic or archaeological resources would be disturbed. Existing historic properties within downtown Vassar would continue to be at risk of damages from future flooding.

### **Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)**

None of the historic properties identified within downtown Vassar would be impacted by construction of the Proposed Action. The Proposed Action would provide protection for all of the properties from flooding associated with 10-year storm events.

It is not anticipated that any historic or cultural resources exist within the APE for the Proposed Action; however, if artifacts or human remains are encountered during construction, work in the vicinity would be discontinued, and the applicant would immediately notify FEMA and the SHPO.

### **Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds**

None of the historic properties identified within downtown Vassar would be impacted by construction of Alternative 3. This alternative would provide protection for all of the properties from flooding associated with 10-year storm events.

It is not anticipated that any historic or cultural resources exist within the APE for Alternative 3; however, if artifacts or human remains are encountered during construction, work in the vicinity would be discontinued, and the applicant would immediately notify FEMA and the SHPO.

Cumulative impacts are those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

A study of the Cass River was published by the USACE in 1982 with suggested flood control alternatives, but none of the alternatives were proposed for actual implementation prior to the Proposed Action. The berm enhancements and culvert replacements are essentially maintenance work, and the diversion conduit and berm extension would minimally impact resources in the area. Due to floodway and floodplain constraints, the City cannot implement structural flood protection measures for greater than 10-year storm event levels. However, the City has acquired and removed 20 structures (both commercial and residential) from the floodplain since 1986 and four structures have been elevated above the 100-year flood elevation. Additionally, a new stormwater management ordinance has been developed in recent years. All of these actions help achieve the objectives set forth in the City's Flood Hazard Mitigation Plan. Since mitigation actions from the past, present, and future fall under one plan, they are complementary actions which will be cumulatively beneficial to restoring the natural functions of the floodplain and reducing flood hazards in the City. Additionally, the Proposed Action could have the beneficial impact of helping businesses return to downtown Vassar and stimulating the local economy by reducing the frequency of flood events by 85 percent.

Alternative 3 would likely have cumulative impacts associated with the loss of agricultural and riparian land. Although Tuscola County is primarily agricultural, future actions within the agricultural areas could reduce the overall acreage devoted to agricultural purposes, contributing to a loss of agricultural land and associated wildlife. Because there is a minimal amount of riparian habitat in the county, future development involving riparian areas could have a substantial cumulative impact on riparian habitat and wildlife.

A public notice advertising the availability of the draft EA for public review was published in the Vassar Pioneer Times and Tuscola County Advertiser on November 5, 2003, and was available for review online at the FEMA website: <http://www.fema.gov/ehp/docs.shtm> (Appendix D). The public was provided the opportunity to review the EA from November 6 to December 6, 2003, and comment on the Proposed Action. No comments were received by FEMA during the public comment period.

This table provides a brief summary of the anticipated permitting and mitigation requirements for the proposed project alternatives.

Alternatives	Permit/Mitigation Requirements
<p><b>Alternative 1 – No Action Alternative</b></p>	<ul style="list-style-type: none"> <li>No permits are required</li> </ul>
<p><b>Alternative 2 – Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action)</b></p>	<ul style="list-style-type: none"> <li>The applicant must apply stormwater and water quality protection BMPs such as placing silt fences and hay bales, and seeding and mulching exposed soils shortly after disturbance. Specifically, Moore Drain would be reshaped and revegetated 33 feet upstream and downstream of all new culverts.</li> <li>Soils that would be stockpiled on-site should be covered to help prevent fugitive dust and soil erosion.</li> <li>The applicant must follow all applicable local, state, and federal laws, regulations, and requirements. They must obtain and comply with all permits required from MDEQ and other agencies prior to initiating work on the project. The project would be reviewed by MDEQ and may require a permit under Part 301, Inland Lakes and Streams, Part 31, Water Resources Protection, and Part 303, Wetlands Protection, of the NREPA. No staging of equipment or construction activities shall begin until all permits are obtained.</li> <li>If any changes are made to the project designs that modify the berm locations provided by MDEQ in their letter dated April 13, 2001, the Applicant must resubmit the designs to FEMA for review and concurrence.</li> <li>Sufficient analyses must be conducted prior to MDEQ permit application to document that Moore Drain alterations will not harmfully impact upstream wetlands.</li> <li>The Tuscola County Drain Commissioner must submit a no-rise certification to FEMA before commencing construction.</li> <li>Vehicle engines should be turned off while not in use, construction roads would be watered when dusty conditions exist, and local residents should be advised to close windows during periods of heavy construction activity Project applicant shall be required to water down construction areas to reduce dust, when</li> </ul>

<b>Alternatives</b>	<b>Permit/Mitigation Requirements</b>
	<p>necessary.</p> <ul style="list-style-type: none"> <li>• To mitigate for tree loss, the applicant should plant native trees elsewhere in the city, or encourage adjacent landowners to allow forest expansion into their backyards.</li> <li>• The applicant should consider modifying the flap gate in accordance with USFWS guidance to lessen the impact to fish migration.</li> <li>• Any hazardous materials discovered, generated, or used during implementation of the proposed project must be disposed of and handled by the applicant in accordance with applicable local, state, and federal regulations.</li> <li>• Construction should be limited to the hours of 7 a.m. and 7 p.m. Monday through Saturday.</li> <li>• The Tuscola County Drain Commissioner should be required to inform residents of the construction period and potential noise impacts, as well as suggested mitigation measures, such as closing windows during construction or planning daily errands around construction times.</li> <li>• All construction activities must be conducted by trained personnel in compliance with OSHA standards and regulations to protect worker safety.</li> <li>• Appropriate signage, detour routes, and safety fencing should be employed to warn the public of dangerous slopes and activities, and restrict access to those sites.</li> <li>• Should any potentially historic or archeological significant materials be discovered during project construction or staging of equipment, all activities on the site shall be halted immediately and the city shall consult with FEMA and the SHPO or other appropriate agency for further guidance.</li> </ul>
<p><b>Alternative 3 – Berm Enhancements and Construction of Two Detention Ponds</b></p>	<ul style="list-style-type: none"> <li>• Excavated soils would be tested and certified clean-fill. Should any of the excavated material test positive for contaminants, that material would be disposed of at a facility permitted to receive such material.</li> <li>• A NPDES permit would be required from the MDEQ prior to construction.</li> <li>• The project applicant should cover stockpiled soils to help prevent fugitive dust and soil erosion.</li> </ul>

Alternatives	Permit/Mitigation Requirements
	<ul style="list-style-type: none"> <li>• The applicant must apply stormwater and water quality protection BMPs such as placing silt fences and hay bales, and seeding and mulching exposed soils shortly after disturbance. In addition to the berm, the detention ponds would be revegetated after completion to prevent future erosion.</li> <li>• The applicant must follow all applicable local, state, and federal laws, regulations, and requirements. They must obtain and comply with all required permits required from MDEQ and other agencies prior to initiating work on the project. The project would be reviewed by MDEQ and may require a permit under Part 301, Inland Lakes and Streams, Part 31, Water Resources Protection, and Part 303, Wetlands Protection, of the NREPA. No staging of equipment or construction activities shall begin until all permits are obtained.</li> <li>• If any changes are made to the project designs that modify the berm locations provided by MDEQ in their letter dated April 13, 2001, the Applicant must resubmit the designs to FEMA for review and concurrence.</li> <li>• Sufficient analyses must be conducted prior to MDEQ permit application to document that the detention ponds will not harmfully impact upstream wetlands.</li> <li>• The Tuscola County Drain Commissioner must submit a no-rise certification to FEMA before commencing construction.</li> <li>• Vehicle engines should be turned off while not in use, construction roads should be watered when dusty conditions exist, and local residents would be advised to close windows during periods of heavy construction activity.</li> <li>• The applicant should replant native trees species along the perimeter of the detention pond, where appropriate, and possibly elsewhere in the city. Additionally, adjacent landowners could be encouraged to allow forest expansion into their backyards.</li> <li>• Any hazardous materials discovered, generated, or used during implementation of the proposed project must be disposed of and handled by the applicant in</li> </ul>

<b>Alternatives</b>	<b>Permit/Mitigation Requirements</b>
	<p>accordance with applicable local, state, and federal regulations.</p> <ul style="list-style-type: none"><li>• Construction would be limited to the hours of 7 a.m. and 7 p.m. Monday through Saturday.</li><li>• The Tuscola County Drain Commissioner should be required to inform residents of the construction period and potential noise impacts.</li><li>• Appropriate signage and safety fencing should be employed to warn the public of dangerous slopes and activities, and restrict access to those sites.</li><li>• Should any potentially historic or archeological significant materials be discovered during project construction or staging of equipment, all activities on the site shall be halted immediately and the city shall consult with FEMA and the SHPO or other appropriate agency for further guidance.</li></ul>

### *Agency Consultation*

The following agencies were consulted during preparation of this EA:

#### **Federal Agencies Consulted**

Federal Emergency Management Agency (FEMA)

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)

U.S. Department of the Interior, Fish and Wildlife Service (USFWS)

#### **State, City, and Local Agencies Consulted**

Michigan Department of Environmental Quality (MDEQ)

Michigan Department of Natural Resources (MDNR)

Michigan State Historic Preservation Office (SHPO)

### *Distribution*

Brent Paul, FEMA Headquarters

Bruce Menerey, Michigan Department of Environmental Quality

Matt Schnepf, Michigan Department of State Police, Emergency Management Division

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Vassar. 2002. City of Vassar, Michigan. Retrieved August 11, 2002 from <http://www.cityofvassar.org/>.

Wade-Trim. 2000. Moore Drain Flood Study.

### *Personal Communication*

Bonnette, Sara. MDEQ, Land and Water Management Division. Personal communication with Lisa Fretwell, URS Environmental Scientist, December 5, 2002.

Graham, James. NRCS. Personal communication with Tom Hay, URS Environmental Scientist, October 2, 2002.

Kern, Sue. 2002. Vassar Deputy Clerk. Personal communication with Lisa Fretwell, URS Environmental Scientist, August 12, 2002.

Richards, Jim. Vassar City Manager. Personal communication with Lisa Fretwell, URS Environmental Scientist, August 20, 2002.

Sherrill, James. Project Manager at Wade-Trim. Personal communication with Lisa Fretwell, URS Environmental Scientist, August 5, 2002.

White, David. 2002. Engineer at Wade-Trim. Personal communication with Lisa Fretwell, URS Environmental Scientist, November 15, 2002 through December 20, 2002.

Lisa Fretwell, Environmental Scientist – Technical researcher. Author of sections on: Geology, Water Resources, Floodplain Management, Air Quality, Hazardous Materials and Wastes, Zoning and Land Use, Visual Resources, Noise, Public Service and Utilities, Traffic and Circulation, Safety and Security, and Threatened and Endangered Species, and Cumulative Impacts.

Tom Hay, Environmental Scientist - Technical researcher. Author of sections on: Wetlands and Terrestrial and Aquatic Environment.

Amy Siegel – Document Quality Control.

Chuck Wilson, Senior Environmental Planner – Document Independent Technical Reviewer.

Don Glondys, Certified Floodplain Manager – Project Manager.

Janet Frey, Project Scientist – URS Task Order Coordinator.

**Appendix A**  
**List of Tables, Figures, and Photographs**

**Tables:**

Table 1: Impact Summary Matrix

**Figures:**

Figure 1: Regional Map

Figure 2: Vicinity Map

Figure 3: Site Map for Alternatives 2 and 3

Figure 4: Tuscola County Soil Survey

Figure 5: Flood Insurance Rate Map

Figure 6: Michigan DNR Wetland Mapping for Project Area

**Photographs:**

Photograph 1: The berm at its tie-in to the railroad track

Photograph 2: The berm as it connects with the downstream side of the railroad ROW

Photograph 3: The berm just upstream of the M-15 bridge

Photograph 4: The berm at its closest point to the Cass River

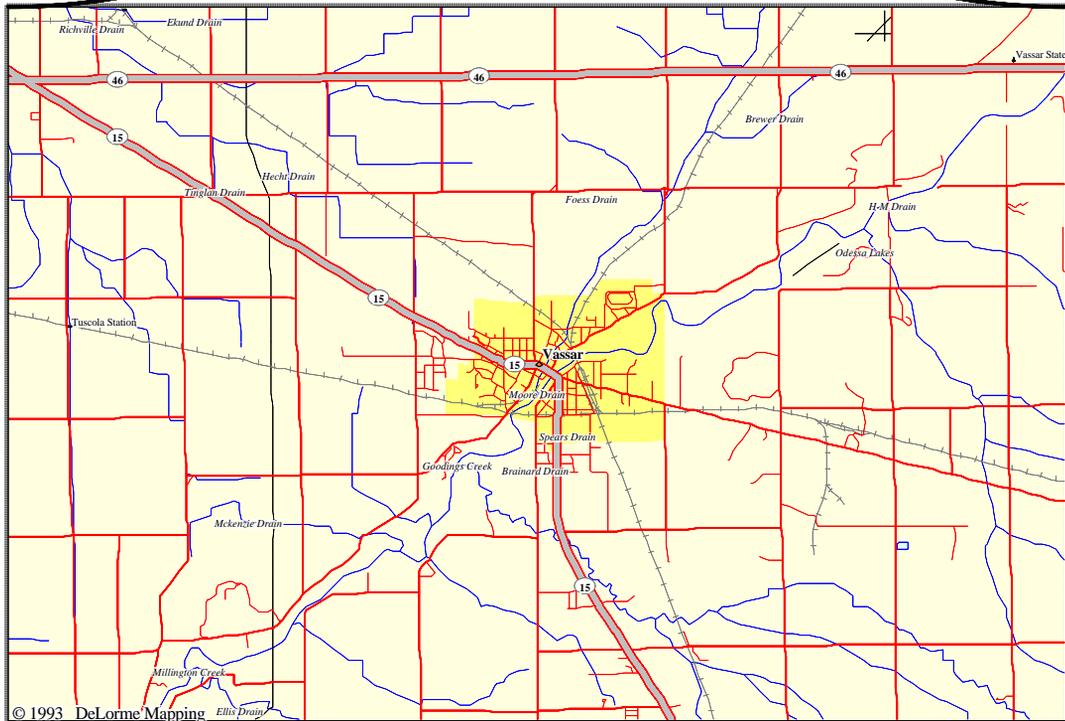
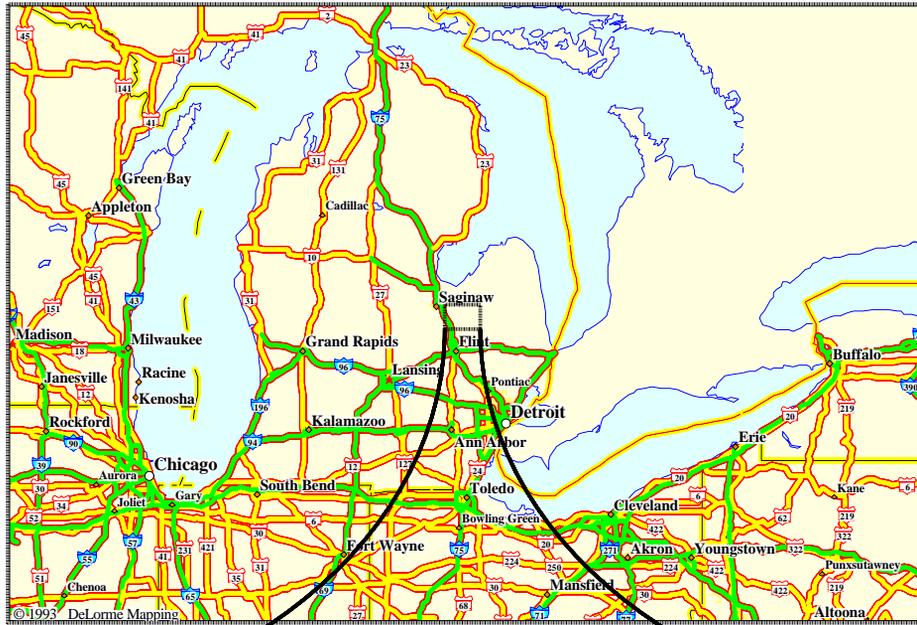
Photograph 5: The confluence of Moore Drain and the Cass River

Photograph 6: The approximate location of the diversion conduit at Moore Drain

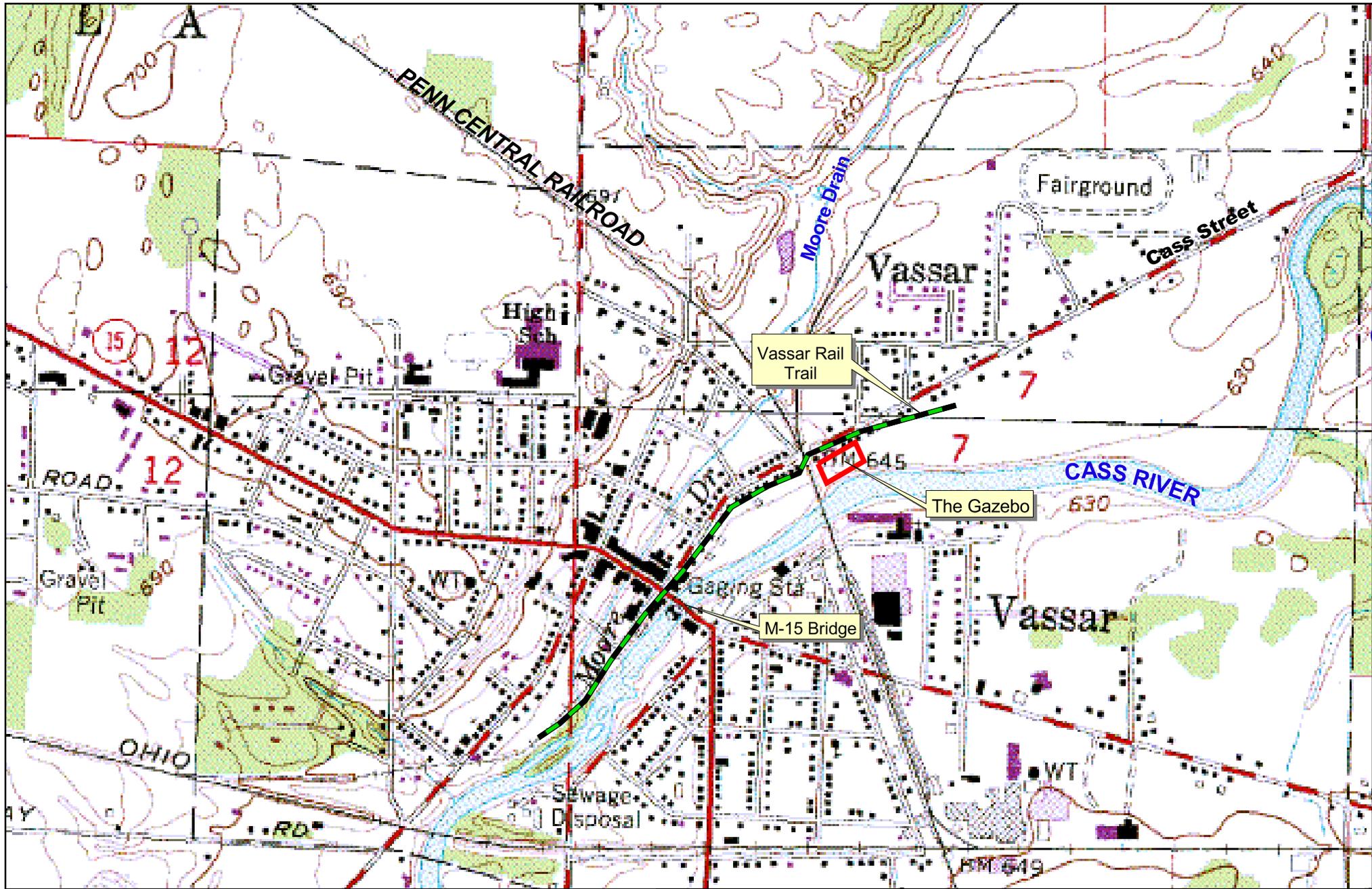
Photograph 7: The approximate location of the diversion conduit 900 feet from the Cass River

Photograph 8: View of one of the undersized culverts on Moore Drain to be replaced

## Figures



CLIENT FEMA				TITLE REGIONAL MAP		
PROJ Vassar, MI Moore Drain EA						
REVISION NO	DES BY	DR BY	12-6-02			PROJ NO 15292488
SCALE NOT TO SCALE	DK	LF	12-6-02			FIGURE 1
FILE Regional Map.PPT	CHK BY	LF	12-6-02			

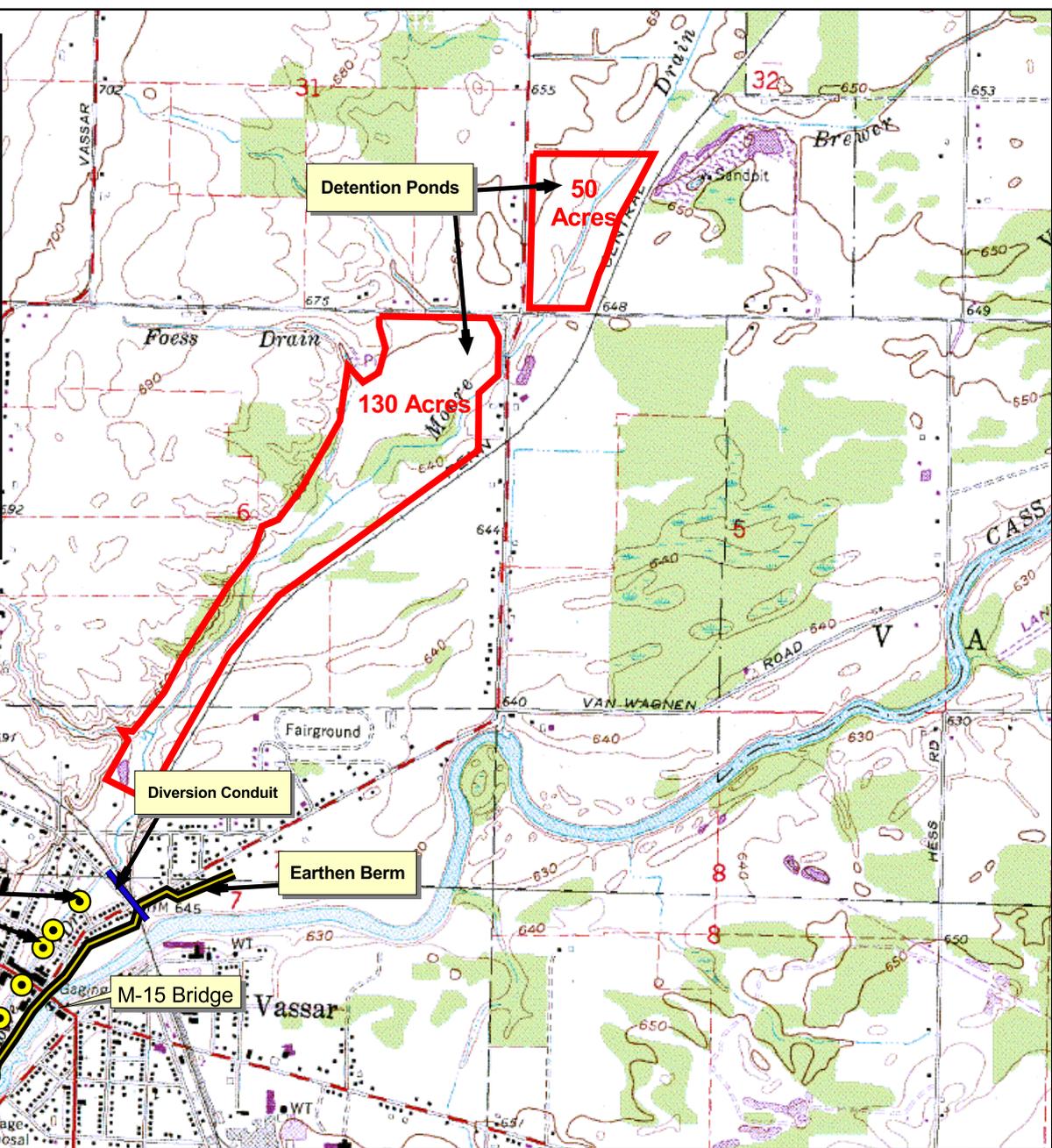
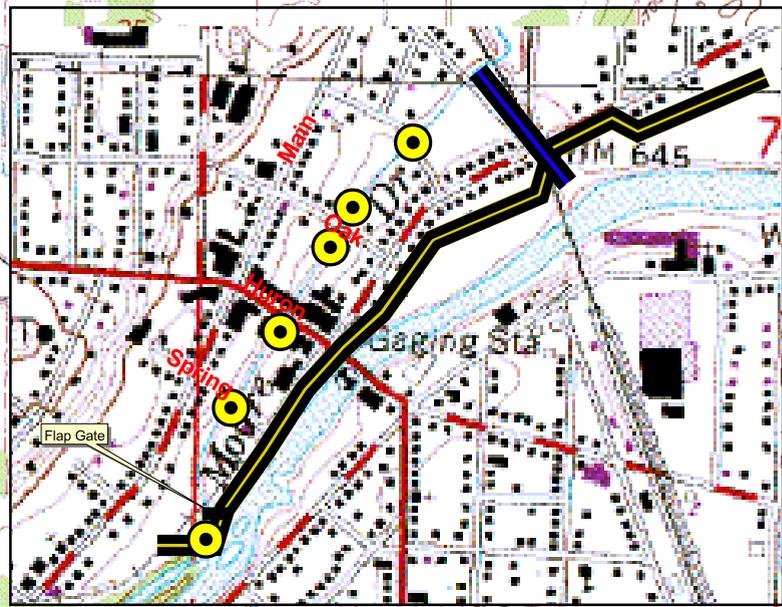


USGS 7.5 Minute Quadrangle  
 Source: Vassar, MI



CLIENT:	<b>FEMA</b>		
PROJ:	Vassar, MI Moore Drain EA		
REV NO:			
SCALE:	1" : 1000'	DES	NG
FILE:	G:\89fema4138\project\vassar_site4.apr	CHK	LF

TITLE:	<b>Vicinity Map</b>	
FIGURE:	2	



USGS 7.5 Minute Quadrangle  
Source: Vassar, MI

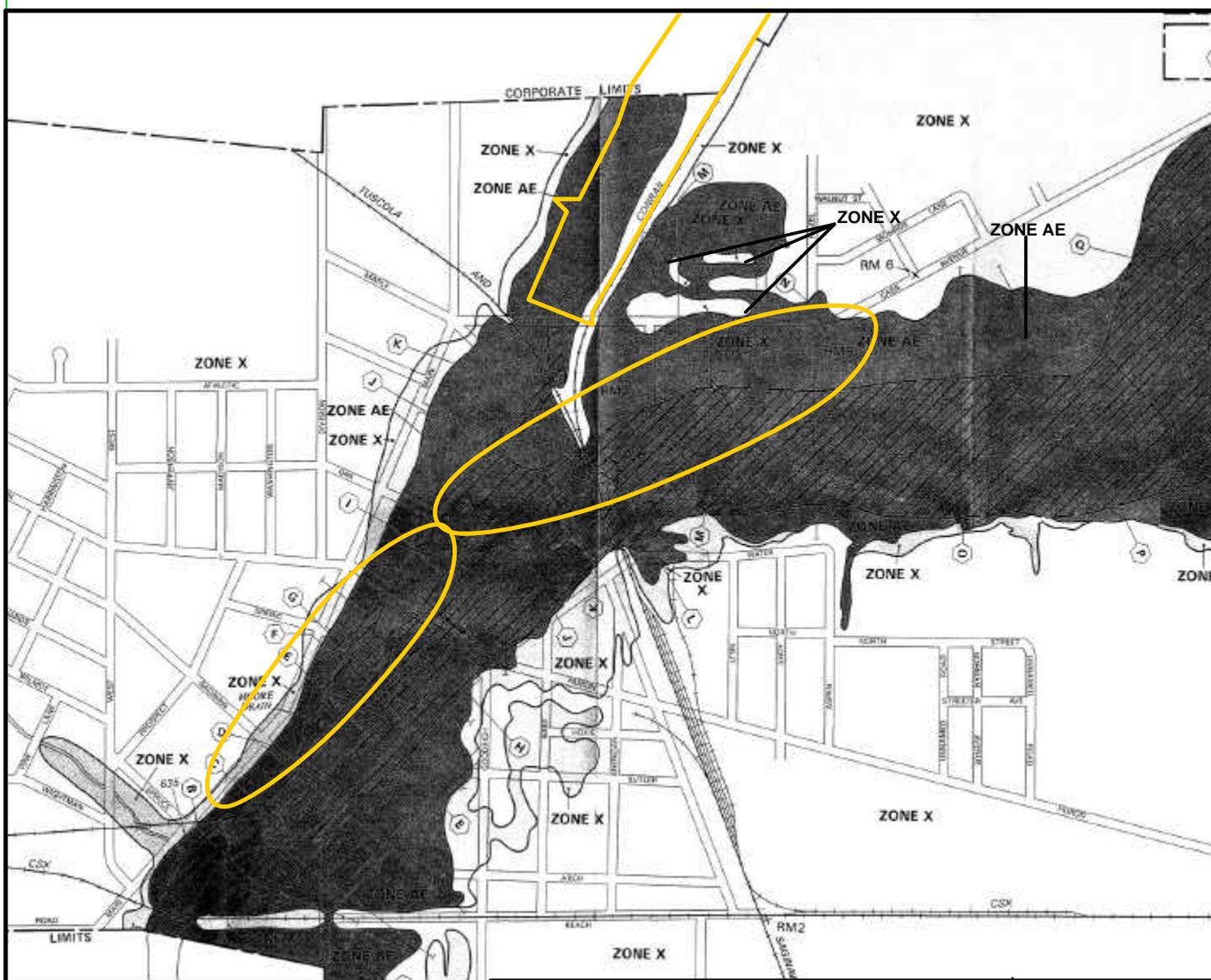


CLIENT: <b>FEMA</b>		TITLE: <b>Site Map for Alternatives 2 and 3</b>	
PROJ: Vassar, MI Moore Drain EA			
REV NO:			
SCALE: 1" : 2000'	DES	NG	
FILE: G:\89fema4138\project\vassar_site4.apr	CHK	LF	



FIGURE:  
3





NATIONAL FLOOD INSURANCE PROGRAM

**FIRM**  
FLOOD INSURANCE RATE MAP

CITY OF  
VASSAR,  
MICHIGAN  
TUSCOLA COUNTY

(ONLY PANEL PRINTED)

COMMUNITY-PANEL NUMBER

260208 0001 C

MAP REVISED:

JUNE 19, 1989



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was published by the Federal Emergency Management Agency. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program Flood Maps, check the FEMA Flood Map Service Center website at www.fema.gov.

○ Approximate Site Locations

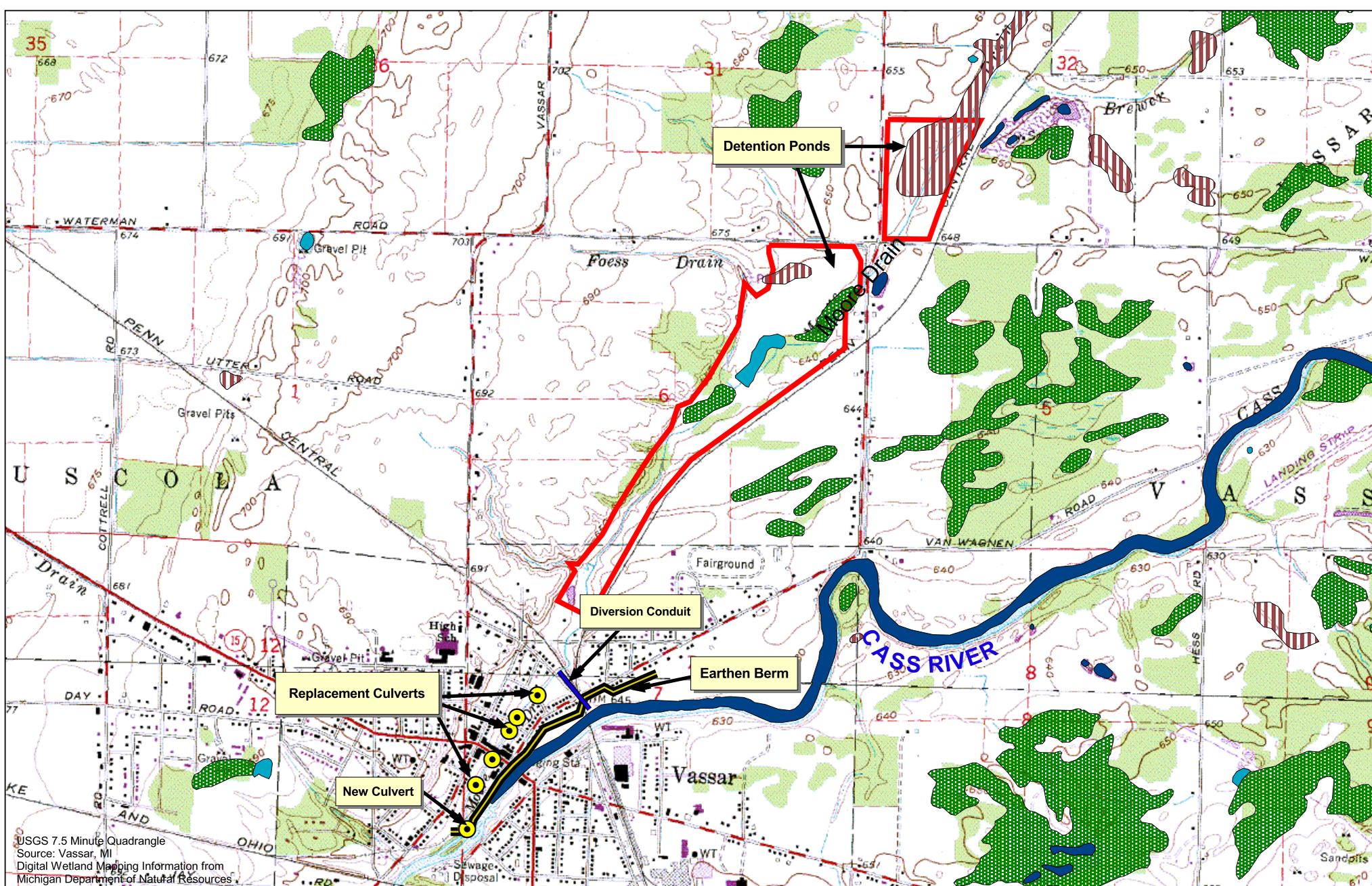
Zone AE = Within the 100-year floodplain

Zone X = Outside of the 100-year floodplain

CLIENT	FEMA		
PROJ	Vassar, Michigan - Moore Drain EA		
REVISION NO	DES BY		
SCALE	NOT TO SCALE	DR BY	LAL 12-30-02
FILE	MAPS.PPT	CHK BY	LF 12-30-02

TITLE	Flood Insurance Rate Map	
PROJ NO	15292488.	
FIGURE	5	

**URS**



USGS 7.5 Minute Quadrangle  
 Source: Vassar, MI  
 Digital Wetland Mapping Information from  
 Michigan Department of Natural Resources

- Wetland Classification**
- Aquatic Bed
  - Beach/Bar
  - Emergent
  - Flat
  - Forested
  - Open Water/Unknown Bottom

- Rocky Shore
- Scrub-Shrub
- Unconsolidated Bottom
- Unconsolidated Shore
- Streambed
- Detention Area



CLIENT: <b>FEMA</b>	
PROJ: Vassar, MI Moore Drain EA	
REV NO:	
SCALE: 1" : 2000'	DES NG
FILE: G:\89fema4138\project\vassar_site4.apr	CHK LF

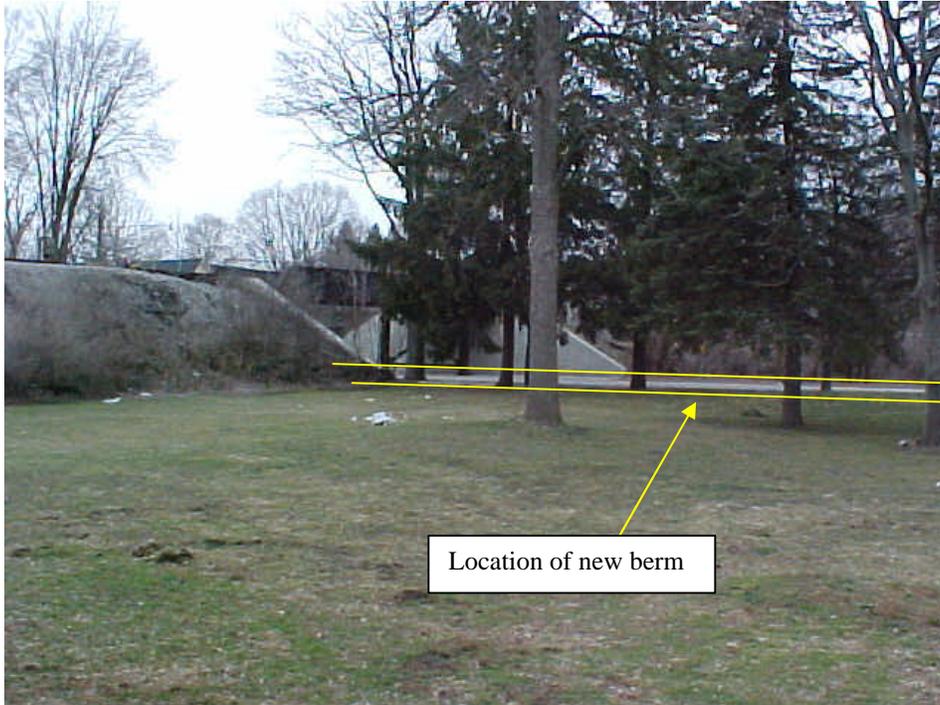
TITLE: **Michigan DNR Wetland Mapping for Project Area**



FIGURE: **6**

## **Photographs**

**Appendix A**  
**Photographs**



Photograph #1: View showing location where new berm would tie into existing railroad track grade. Berm would be approximately 2 feet in height at this location and approximately 400 feet from Cass River.

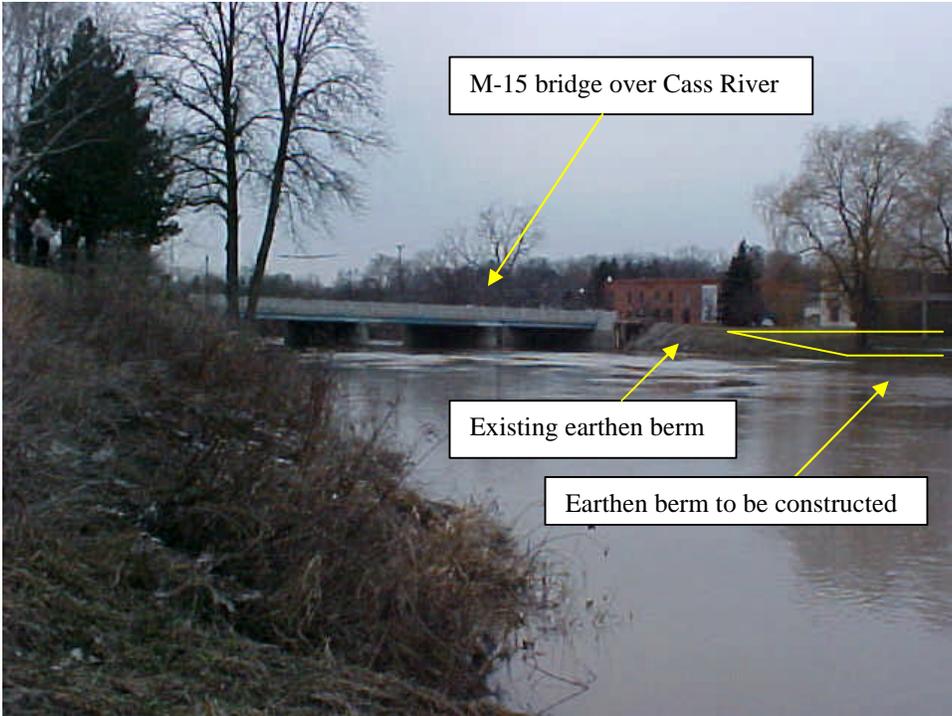


Photograph #2: View representing approximate location of proposed earthen berm as it crosses a forested area and connects with the downstream side of existing railroad ROW. The berm would be between 100 and 500 feet from Cass River and 2 to 3 feet high.

**Appendix A**  
**Photographs**

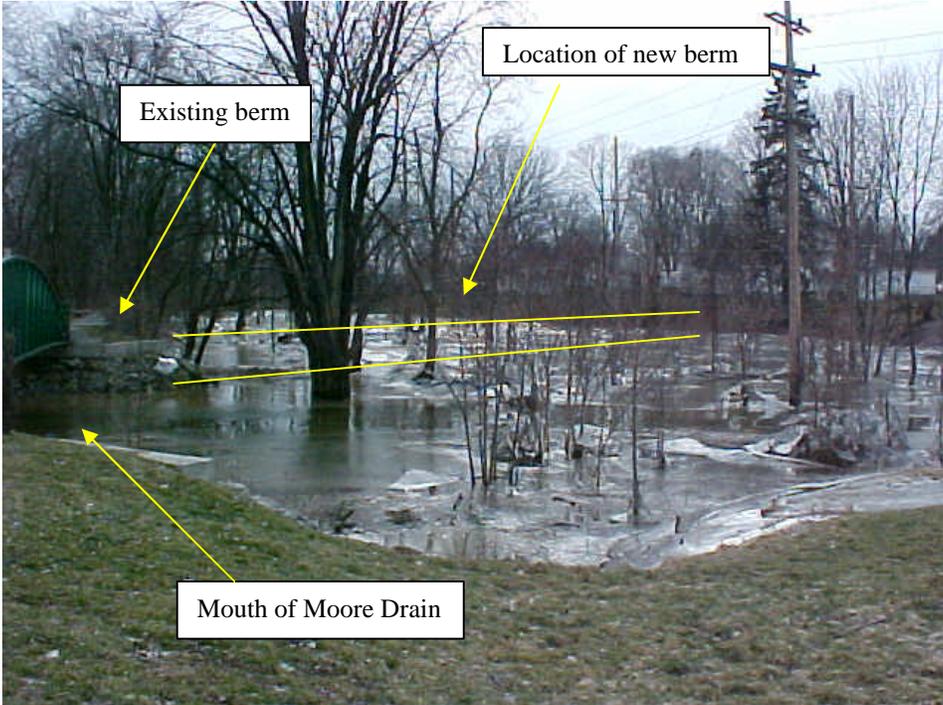


Photograph #3: View representing the approximate location of the earthen berm and its relationship to residences just upstream of the M-15 bridge. The berm would be approximately 50 feet from Cass River.

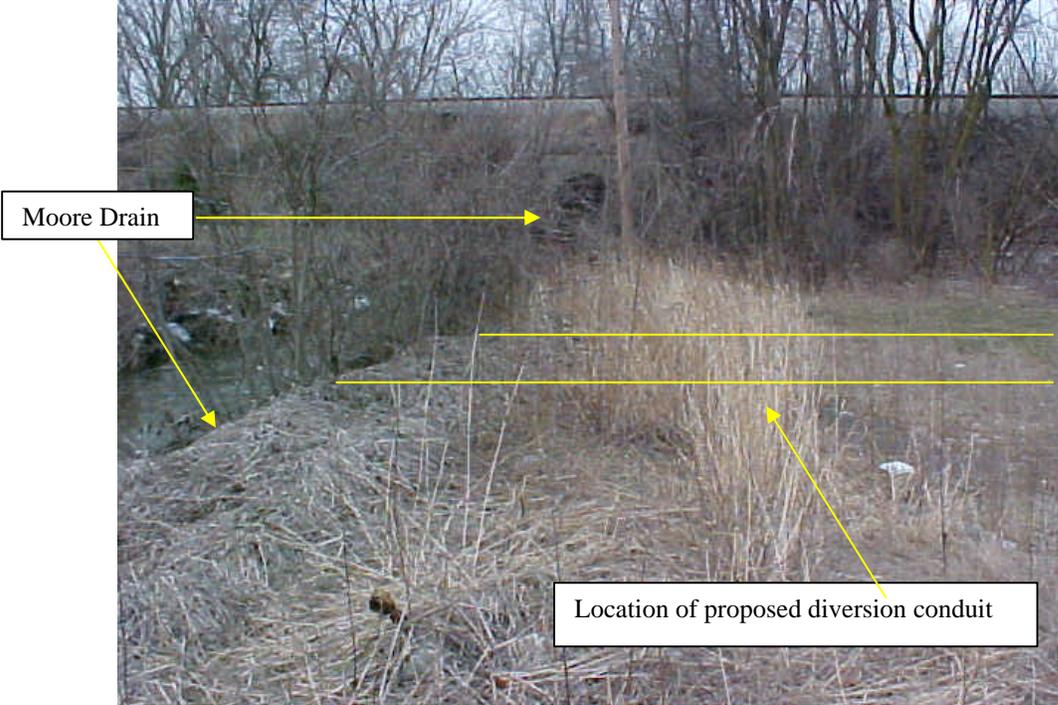


Photograph #4: View showing proposed earthen berm construction at its closest point to the Cass River. Also visible is the upstream extent of the existing earthen berm to be enlarged.

**Appendix A**  
**Photographs**

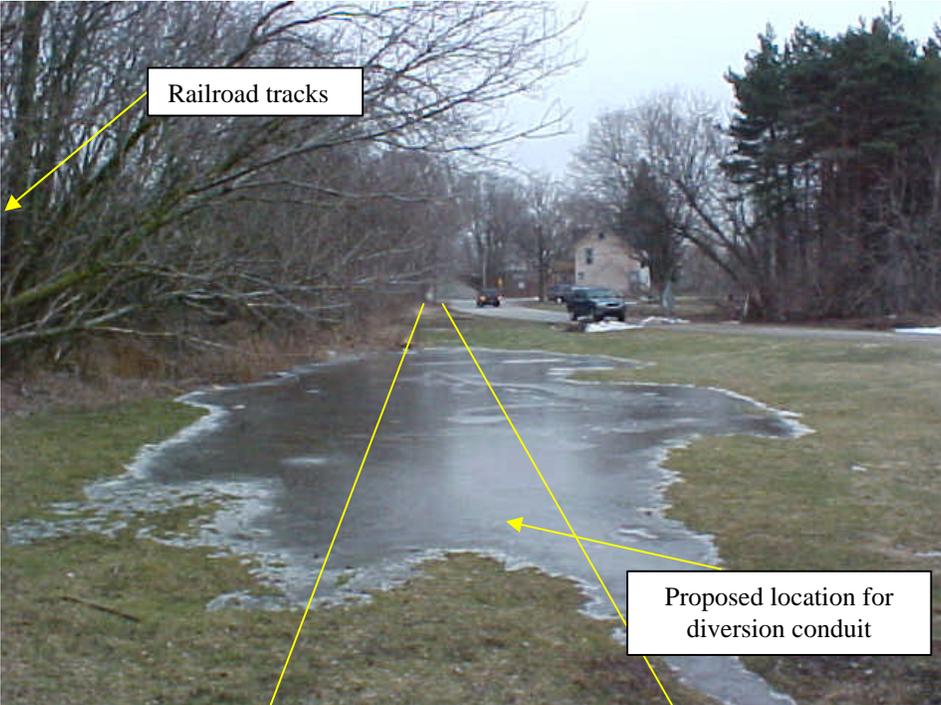


Photograph #5: View from Moore Drain/Cass River confluence showing Moore Drain and associated backwater area to be filled with earthen berm. On left is existing berm and mouth of Moore Drain to be filled and retrofitted with flap gate.

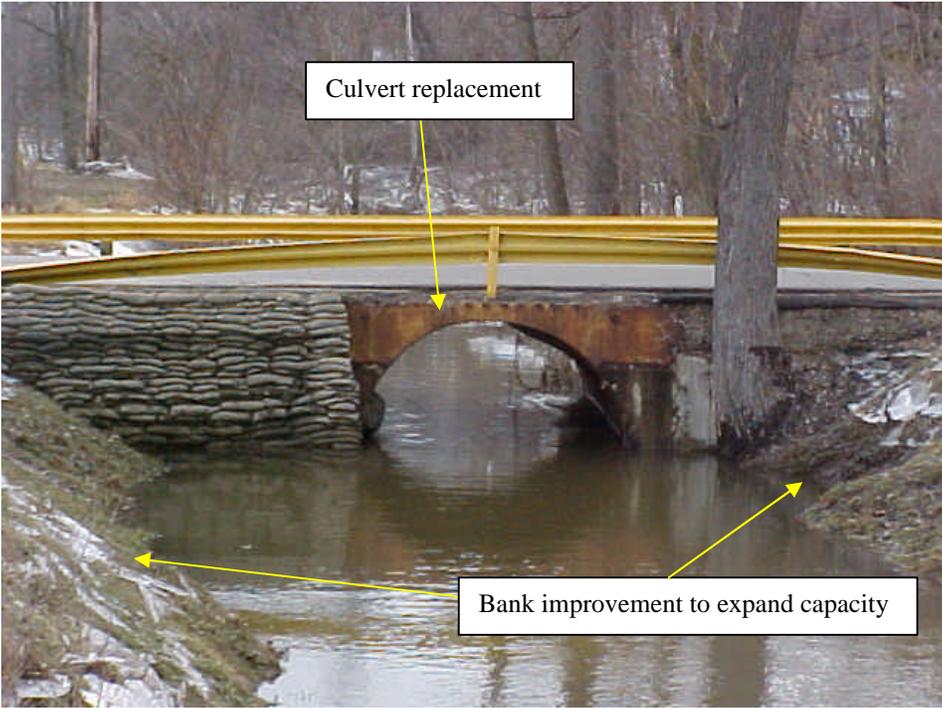


Photograph #6: View of Moore drain upstream of downtown Vassar at railroad tracks. View shows approximate location of diversion conduit to connect Moore Drain and Cass River.

**Appendix A  
Photographs**



Photograph #7: View of area to receive diversion pipe from Moore Drain looking towards the Cass River (not visible in photo). Cass River is approximately 900 feet away.



Photograph #8: View of Moore Drain as it passes through downtown Vassar and undersized culvert to be replaced with larger RCP culvert.

**Appendix B**  
**Agency Correspondence**

To obtain copies of agency correspondence, please contact:

Janet Frey  
URS Group, Inc.  
200 Orchard Ridge Drive, Suite 101  
Gaithersburg, Maryland, 20878  
(301) 670-3345  
janet\_frey@urscorp.com

**Appendix C**  
**EO 11988 – Floodplain Management & EO 11990 – Wetland Protection**  
**Eight-Step Planning Process**

EO 11988 & 11990 Eight-Step Planning Process

<p><b>Step 1:</b> Determine whether the Proposed Action is located in a wetland and/or the 100-year floodplain, or whether it has the potential to affect or be affected by a floodplain or wetland.</p>	<p><b>Project Analysis:</b> The City of Vassar participates in the NFIP, and the project area is located on FIRM Community Panel Number 260208 0001C, effective June 19, 1989. According to the FIRM, the project site is located within the 100-year floodplain and floodway of the Cass River. The Proposed Action would provide relief from flooding associated with the 10-year storm event. A preliminary hydrologic and hydraulic analysis for the Proposed Action concluded that the project would not significantly impact the 100-year stage of the Cass River (Wade-Trim, 2000).</p> <p>The project could possibly affect two wetland areas; a 1-acre depression near the mouth of the Moore Drain, and an area adjacent to the forested area between the M-15 Bridge and a Penn Central Railroad bridge, adjacent to the Cass River. The 1-acre area is dominated by cultivar grasses and regularly mowed. The second wetland is dominated by willow species and would likely be regulated should construction activities create disturbance (pers. comm., Bonnette). A formal wetland delineation might be required prior to final design and permitting to quantify actual wetland impacts.</p>
<p><b>Step 2:</b> Notify public at earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision-making process.</p>	<p><b>Project Analysis:</b> Initial publication was provided by FEMA on October 29, 2000 in the Detroit Free Press. A public notice advertising the availability of the draft EA for public review was published in the Vassar Pioneer Times and the Tuscola County Advertiser on December 5, 2003. The public was provided 30 days to review and comment on the draft EA.</p>
<p><b>Step 3:</b> Identify and evaluate practicable alternatives to locating the Proposed Action in a floodplain or wetland.</p>	<p><b>No alternatives were identified to reduce flooding in the City of Vassar that do not involve construction within the 100-year floodplain of the Cass River. The avoidance of wetlands and the reduction of floodplain impacts were considered for the berm locations and would be incorporated in final designs.</b></p> <p><b>Project Analysis:</b> The following three alternatives were evaluated:</p> <p>Alternative 1: No Action. FEMA funds would</p>

EO 11988 & 11990 Eight-Step Planning Process

	<p>not be used for improvements to the existing drainage system in Tuscola County.</p> <p>Alternative 2: Proposed Action. Berm modifications would be made along the Cass River to offer protection from the 10-year storm event, a diversion conduit would be constructed to ease flooding in the City of Vassar, and 5 culverts would be replaced along Moore Drain.</p> <p>Alternative 3: The same berm modifications would be made as described for the Proposed Action and two detention ponds (50 acres and 130 acres) would be constructed along Moore Drain, upstream from the City of Vassar.</p>
<p><b>Step 4:</b> Identify the full range of potential direct or indirect impacts associated with the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the Proposed Action.</p>	<p><b>Project Analysis:</b> Under the No Action Alternative, flooding would continue to impact the City of Vassar, but there would be no impacts to floodplains or wetlands.</p> <p>Under Alternative 2, the Proposed Action, no long-term impacts to the floodplain would be anticipated, as storm events greater than the 10-year recurrence interval would still impact the City. Soil compaction in the floodplain could temporarily affect its filtering ability (by decreasing infiltration rates), but the area of impact would be limited and any impacts would not be long-term. Since the floodplain habitat that would be disturbed as part of the project has been previously disturbed and is on the fringe of an urban area, the value of the floodplain habitat would not be altered. Additionally, the project would help to enhance the floodplain’s storage capacity and ability to convey floodwaters. Berm construction would disturb two potential wetland areas (Figure 6). Wetland impacts from culvert replacements and construction of the diversion conduit are not anticipated to impact wetlands. Preliminary estimates indicate that less than 0.5 acre of wetlands would need to be constructed to mitigate wetland loss.</p> <p>Under Alternative 3, no long-term impacts to the floodplain would be anticipated, as storm events greater than the 10-year recurrence interval would still impact the City. Soil compaction in the floodplain could temporarily affect its filtering ability (by decreasing infiltration rates), but the area of impact would</p>

EO 11988 & 11990 Eight-Step Planning Process

	<p>be limited and any impacts would not be long-term. Since the floodplain habitat that would be disturbed as part of the project has been previously disturbed and is on the fringe of an urban area, the value of the floodplain habitat would not be altered. Additionally, the project would help to enhance the floodplain's storage capacity and ability to convey floodwaters. Berm construction would disturb two potential wetland areas. The 130-acre pond would disturb approximately 22 acres of forested, emergent, and scrub-shrub wetlands, and the 50-acre pond would disturb approximately 19 acres of scrub-shrub wetlands (Figure 6). Preliminary estimates indicate that up to 62 acres of wetland construction would be required to mitigate wetland loss.</p>
<p><b>Step 5:</b> Minimize the potential adverse impacts to work within floodplains and wetlands to be identified under Step 4, restore and preserve the natural and beneficial values served by wetlands.</p>	<p><b>Project Analysis:</b> For Alternatives 2 and 3, the MDEQ would review the project and likely require a permit under Part 31, Water Resources Protection; Part 301, Inland Lakes and Streams; and Part 303, Wetlands Protection, of the NREPA. A single permit would address floodplain, stream, and wetland impacts. Under the permit conditions, 1.5 acres of wetlands would be reconstructed for every acre lost. The applicant must comply with the terms and conditions of the permit including any mitigation measures identified by MDEQ. To ensure that the project would not increase the 100-year floodplain elevation of Moore Drain or the Cass River, Tuscola County must submit a no-rise certificate to FEMA before commencing construction. The Applicant must also demonstrate to MDEQ that the selected alternative will not adversely impact upstream wetlands along Moore Drain.</p> <p>The applicant must follow all applicable local, state, and federal laws, regulations, and requirements and obtain and comply with all required permits and approvals, prior to initiating work on this project. BMPs for soil erosion prevention and containment would be utilized during staging of equipment and construction activities to minimize impacts to water quality and wetlands from sedimentation.</p>

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<p><b>Step 6:</b> Re-evaluate the Proposed Action to determine 1) if it is still practicable in light of its exposure to flood hazards; 2) the extent to which it will aggravate the hazards to others; and 3) its potential to disrupt floodplain and wetland values.</p>	<p><b>Project Analysis:</b> Comments received from the MDEQ as part of the floodplain and wetland permitting process must be addressed prior to receiving authorization from this agency for the proposed project. This may include a re-evaluation of floodplain and wetland impacts and additional impact reductions, if necessary.</p> <p>The Proposed Action is still practicable based on the flood reduction objective. The project would reduce the frequency of flooding by 85 percent with no impacts to the 100-year floodplain and minimal impacts to wetlands.</p>
<p><b>Step 7:</b> If the agency decides to take an action in a floodplain or wetland, prepare and provide the public with a finding and explanation of any final decision that the floodplain or wetland is the only practicable alternative. The explanation should include any relevant factors considered in the decision-making process.</p>	<p><b>Project Analysis:</b> A public notice will be made indicating FEMA’s decision to proceed with the Proposed Action. The notice will indicate the rationale for FEMA’s decision to issue a Finding of No Significant Impact for the Proposed Action.</p>
<p><b>Step 8:</b> Review the implementation and post-implementation phases of the Proposed Action to ensure that the requirements of the EOs are fully implemented. Oversight responsibility shall be integrated into existing processes.</p>	<p><b>Project Analysis:</b> This step is integrated into the NEPA process and FEMA project management and oversight functions.</p>

**Appendix D**  
**Public Notice**

**Federal Emergency Management Agency  
PUBLIC NOTICE**

**Notice of Availability of the Draft Environmental Assessment for the Moore Drain Flood Mitigation, Tuscola County Drain Commissioner Tuscola County, Michigan.**

**FEMA-DR-1346-MI, HMGP Application A1346.18**

Interested persons are hereby notified that the Federal Emergency Management Agency (FEMA) is proposing to assist in the funding of flood mitigation measures for Moore Drain and the Cass River in Tuscola County. In accordance with the National Environmental Policy Act (NEPA) of 1969 and the implementing regulations of FEMA, an Environmental Assessment (EA) is being prepared to assess the potential impacts of the proposed action on the human and natural environment. This also provides public notice to invite public comments on the proposed project in accordance with Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands. In addition, this notice and the draft EA provide information to the public on potential impacts to historic and cultural resources from the proposed undertaking, as outlined in the National Historic Preservation Act of 1966.

The EA evaluates alternatives that provide for compliance with applicable environmental laws. The alternatives to be evaluated include (1) No Action; (2) Berm Enhancements, Installation of a Diversion Conduit, and Moore Drain Upgrades (Proposed Action), and (3) Berm Enhancements and Construction of Two Detention Ponds. The construction alternatives evaluated in the EA (Alternatives 2 and 3) would provide protection from Cass River flood events up to the 10-year storm; Cass River flood events greater than the 10-year recurrence interval would still affect the City.

The draft EA is available for review between November 6, 2003 and December 6, 2003, at the following locations between the given hours:

Tuscola County Drain Commissioners Office  
Sarah M. Pistro  
440 North State Street  
Caro, MI 48723-1568  
(989) 672-3820  
8am to 5pm, Mon-Fri

Vassar City Hall  
Scott Adkins  
287 East Huron Avenue  
Vassar, MI 48768  
(989) 823-8517  
8am to 5pm, Mon-Fri

The draft Environmental Assessment is also available for review online at the FEMA website <http://www.fema.gov/ehp/docs.shtm>.

Written comments regarding this environmental action should be received no later than 5 p.m. on December 6, 2003 by Jeanne Millin, Regional Environmental Officer, 536 South Clark, 6<sup>th</sup> Floor, Chicago, IL 60605-1521, or at [Jeanne.Millin@dhs.gov](mailto:Jeanne.Millin@dhs.gov). If no comments are received by the above deadline, the draft EA will be considered final and a Finding of No Significant Impact will be published by FEMA.

The public may request a copy of the final environmental documents from Jeanne Millin, Regional Environmental Officer, 536 South Clark, 6<sup>th</sup> Floor, Chicago, IL 60605-1521.

**Appendix E**  
**Public Comments**

No comments were received during the public review period.